

Department of Environmental Quality (DEQ) and
The Dow Chemical Company (Dow)

TRI-CITIES DIOXIN COMMUNITY MEETING

Thursday, February 8, 2007

6:30 - 9:00 p.m.

Horizons Conference Center
6200 State Street
Saginaw, Michigan

REPORTED BY:

Lori L. Brady, CER-6925
Certified Electronic Recorder
Bay Area Reporting, Inc.
(800) 919-4441

1 Thursday, February 8, 2007

2 Saginaw, Michigan 6:30 p.m.

3 CHUCK NELSON (FACILITATOR): A couple things
4 that I would note for you tonight, if you look at the
5 front of the agenda first -- by the way, my name is
6 Chuck Nelson, I'm the facilitator for tonight's
7 meeting. In my day job I work at Michigan State
8 University in the Department of Community Agriculture
9 Recreation and Resource Studies, CARRS, because that
10 kind of fits Michigan.

11 Anyways, tonight, we have listened to what
12 folks said after the last meeting. They asked for a
13 little less on presentation, a little more opportunity
14 to comment. We have worked to accommodate that need on
15 your part, and so you will see there is a full hour at
16 the end for folks to comment ask questions, etc.

17 I would also note that we put times on the
18 agenda tonight so you can see the approximate time of
19 presentations. A couple things ran over last time. I
20 was a little reluctant to cut people off. I won't be
21 very reluctant tonight. If the presentations runs
22 over, because I want to make sure everybody gets their
23 opportunity. So, I appreciate if you'd take a look at
24 the back at the community meeting ground rules. Most
25 of you are familiar with them. They are rules of

1 common courtesy. I look forward to a good and useful
2 session tonight.

3 I would also have you note that much of the
4 information and much more than you will hear tonight is
5 on the DEQ's dioxin portion of their website, the DEQ
6 dioxin website. Be sure to look there for some of the
7 very lengthy pieces of information that you may not
8 grasp at all tonight. Be sure to look there.

9 Otherwise, on the front I would have you note we had a
10 couple changes in meeting dates for the rest of the
11 year due to a variety of scheduling challenges. So,
12 please note that the additional meetings will be May
13 3rd, August 9th, and November 28th. May 3rd and November
14 28th are different days than we had originally proposed
15 due to a variety of circumstances, again, we've had to
16 change those dates slightly. So, if you're doing an
17 annual calendar, please note those changes.

18 With that, I'd like to start. First we'd
19 like to do introductions. Jim would you introduce the
20 folks here from the State of Michigan and perhaps the
21 EPA? And they've asked that you be extremely careful
22 to use microphones because that certainly helps them run
23 the TV program effectively.

24 JIM SYGO: The easy way to do this, can all
25 the DEQ staff and MDCH and EPA stand up and we'll try

1 to go through them.

2 On the right here is Sue Kelber-Matlock from
3 our Saginaw Bay Office.

4 George Bruchman who's the chief of waste and
5 hazardous materials division.

6 Steve Buda who's acting unit chief for the
7 hazardous waste program right now.

8 We have Al Taylor who's a geologist on this
9 project.

10 Deb MacKenzie-Taylor who is the toxicologist
11 on this project.

12 Terry Walkington who's the district
13 supervisor for waste and hazardous materials division
14 for DEQ.

15 We have Art Ostaszewski in the back there who
16 is also one of the EQAs on this project, environmental
17 quality analysts.

18 Korey Groetsch with Michigan Department of
19 Community Health.

20 At the back table we have Cheryl Howe who is
21 the coordinator for this project.

22 Bob McCann who is out of our press office at
23 the Department of Environmental Quality.

24 Trisha Peters who's also with the Saginaw Bay
25 District office.

1 And then up here we also have from the EPA,
2 John Steckadee who is regional counsel at EPA.

3 And Greg Rutloff who's, I guess, EPA's
4 project for the particular project, as well.

5 Did I get everybody from the DEQ, MDCH? I
6 think we've got everybody.

7 JOSEPH HAAS: Just myself, Jim, Joseph Haas
8 with DEQ Land Water Management.

9 JOHN MUSSER: Good evening everyone, good to
10 see you all. Thanks for coming out on a cold night. I
11 hope we can give you some good information this
12 evening. Just to introduce some of the Dow folks here
13 this evening.

14 Gregg Cochran is our issue leader from Dow.
15 Peter Wright, our legal counsel.

16 Tom Long is one of our consultants with the
17 Sapphire Group, risk management, toxicology.

18 Peter Simon from Ann Arbor Technical
19 Services.

20 Phil Simon from Ann Arbor Technical Services.

21 Joe Heimbuch another one of our consultants
22 with DeMaximus.

23 Dave Richardson from ATS.

24 Bob Budinsky from Dow, toxicology.

25 Kent Woodburn, also from toxicology

1 ecological.

2 David Gustafson, regulatory affairs.

3 Denise Kay from ENTRIX.

4 Jack Clough consultant to Dow for
5 communications and outreach.

6 Ben Baker, I know he's around, he just
7 doesn't show himself very often.

8 And Mike Carson, he's our regional medical
9 director.

10 Did I miss anybody else from Dow here?

11 Oh yes, and Jim Braithwaite of ATS.

12 CHUCK NELSON: Our first item tonight is the
13 results of the Upper Tittabawassee River floodplain
14 GeoMorph characterization. I would note that this is
15 the large handout in the back with the color slides.
16 You will note that this presentation and the overview
17 of the Pilot Corrective Action Plan (PCAP) for the
18 Upper Tittabawassee River are lumped together in a
19 single presentation here. We will hope to go through
20 it in that manner for you tonight with opts for
21 questions after the presentation about the PCAP. Now,
22 if there are burning clarification questions before
23 hand, we will certainly work to answer those, but we'd
24 like to get this whole thing out in a lump the way the
25 presentation is put together. The agenda doesn't quite

1 reflect that. There will be time for questions about
2 it after the whole presentation, but also considerable
3 time for questions at the end in the hour from 8:00 to
4 9:00. So, take it away, sir.

5 PETER SIMON: Good evening. My name's Peter
6 Simon. I'm the project manager for Ann Arbor Technical
7 Services for the site characterization of the Upper
8 Tittabawassee River project.

9 Tonight I'd like to start by kind of going
10 back a little bit of time. May of last year I stood up
11 here and presented an overall process and plan for
12 going out and delineating the nature and extent of the
13 upper 6-1/2 miles of the Tittabawassee River. I
14 presented that in May of last year (delete). We also
15 at that time presented a rather aggressive schedule to
16 go out and complete that characterization. That work
17 plan to complete that characterization was submitted to
18 the agencies on June 1st. We received formal approval
19 in mid July, and began implementing that program at the
20 beginning of August.

21 That work in terms of the site
22 characterization was completed about mid December. The
23 site characterization report for which we're going to
24 discuss tonight was filed and submitted about a week
25 ago. So, I pull that forward because we've met our

1 deadlines. We've met our goals, and there's a lot of
2 work by DEQ and US EPA and Dow and their consultants
3 that have gotten us here today to be able to present a
4 very detailed analysis of the upper 6-1/2 miles of the
5 Tittabawassee River.

6 Tonight I'm going to talk a little bit about
7 where the project stands overall and provide a general
8 update of that. I'm going to provide an overview of
9 this detailed site characterization, the GeoMorph-based
10 site characterization, as well as talk about Pilot
11 Corrective Action projects that we have planned for
12 2007.

13 General project update. Along the way there
14 were some additional tasks that we were given in 2006,
15 in addition to doing the detailed site
16 characterization. That involved developing a remedial
17 investigation work plan for the Tittabawassee River and
18 upper 6 miles of the Saginaw River. We began that
19 effort in the summer of 2006, and it really is an
20 expansion from the basis or the GeoMorph-based site
21 characterization model that we are piloting or we pilot
22 (delete) for the upper 6 miles. In addition to that,
23 we've completed and submitted the upper Tittabawassee
24 site characterization report on February 1st. We've
25 also initiated a series of Pilot Corrective Action

1 Plans for the Upper Tittabawassee River. We'll talk
2 more about those later in the presentation.

3 Just for reference purposes, the upper 6-1/2
4 miles starts at the confluence of the Tittabawassee and
5 Chippewa River. It extends downstream about 6.5 river
6 miles, or about a mile and a half south of Smith's
7 Crossing. The RIWP element of that expands the
8 GeoMorph-based site characterize to include the
9 remaining 15.6 miles of the Tittabawassee River, as
10 well as the upper 6 miles of the Saginaw River.

11 To refresh for some of you who may not have
12 seen the early presentations, the GeoMorph-based site
13 characterization involves a number of layers, (delete)
14 what we refer to as layers. They're independent layers
15 to help us understand and really peel back the onion,
16 you know, the layers of an onion, so to speak, of how
17 the river is evolved over the period of interest. In
18 this case we're looking at something in the
19 neighborhood
20 of about 100 years. In doing that we developed a
21 stationing and reach designations. Reaches are really
22 broken down based on river flow regime changes, so
23 anytime you have a bridge or you have a major tributary
24 that changes the flow characteristics of that part of
25 the river we introduce or we develop a new reach --

1 reach designation. In this graphic we have Reaches A
2 through O. Reaches A through O comprises (delete) the
3 upper 6.5 miles of the Tittabawassee River. You can
4 sit back and look at it and say, well, it's pretty
5 straight, look at that, it doesn't really change that
6 much. But, in fact, it really does. There's a lot of
7 manmade tributaries. There's a lot of drainage swales.
8 There's a lot of bridges and abutments that change the
9 flow characteristics through the upper 6-1/2 miles.
10 It's important to look at these on an individual basis
11 or individual reaches, because the surface development,
12 the river landscape development within those reaches
13 gives you a lot of insight on how other surfaces within
14 that reach are going to behave. For reference, I've
15 included Gordonville Road Bridge, and also Smith's
16 Crossing.

17 The Tittabawassee River presents some pretty
18 challenging opportunities. For many of you who live in
19 the area, you've seen it under low flow conditions when
20 the base flow is 100 -- or 1,000 cubic feet/second
21 (CFS). You can walk, literally, in many areas across
22 the river. During the winter or during the spring and
23 late fall or early fall the river really changes.
24 Understanding the river characteristics over time and,
25 depending on what the flow characteristics are at any

1 given point in time, is the **key** in understanding the
2 erosion and deposition aspects of the river. This
3 graphic here illustrates a standard low flow kind of
4 condition on the Tittabawassee River. Under north low
5 flow conditions the river is within its banks. You
6 have normal erosion on the outside of meander bends,
7 and deposition occurring on the inside of meander
8 bends. That's important because over time materials or
9 sediments that are in the water will deposit
10 predictably on the inside of meander bends.

11 Now, the Tittabawassee River has some other
12 interesting characteristics. Looking at manmade
13 influences or changes over time is an important
14 element. About the time of the industrial age in this
15 area there was a series of dams installed upstream of
16 the Midland area. The result of those series of dams
17 changed the flow characteristics through the
18 Tittabawassee River. It restricted the flow through
19 the Tittabawassee River and really reduced the channel
20 size in the Tittabawassee River. What does that all
21 mean? Well, it resulted in a series of levees, and
22 we'll talk more about those levees later, because
23 that's an important element. A series of natural and
24 historic natural, or pre-industrial and post-industrial
25 levees. You can **see** graphically on this illustration.

1 An example would be, this would be a pre-industrial
2 levee or prior to the dams, and this would be a post-
3 industrial levee, after the dams. That will be a
4 continuing theme that I'll talk about as we get into
5 the discussion of nature and extent.

6 But it really is about understanding the
7 erosion and deposition characteristics of the river.
8 And, again, this is a simulation or graphic
9 illustration of the terrace or surface development
10 within the floodplain under low flow or normal
11 conditions. Under high flow conditions the river
12 really doesn't have any regard for the existing
13 channel. It runs wherever it wants, and many of you
14 have seen that. It goes scarp to scarp. That presents
15 a series of interesting opportunities in understanding
16 the erosion and deposition, both for materials or
17 sediments in the channel, as well as in the floodplain.
18 So, those types of conditions are important, not only
19 for understanding the nature and extent investigation,
20 but also when you begin to look at what kinds of
21 remedies are we going to implement to address areas
22 that are of concern.

23 GeoMorph-based sampling design. This
24 illustration, or this graphic here, you'll see a lot of
25 greens and blues, light greens, and pinks. In addition

1 you'll see a series of, what we refer to as **sampling**
2 transects. The important thing to draw away from this
3 is the landscape of the river is not simple. There is
4 a lot of surface development under low flow and high
5 flow conditions. The dark green surfaces in this area
6 are what we refer to as high terraces. The blue areas
7 are designated as wetlands. The light green areas are
8 designated as intermediate terraces and the pink areas
9 are designated as either natural levees or historic
10 natural levees. Understanding that river landscape
11 between, in this example, Gordonville Road Bridge and
12 Smith's Crossing is an important element because these
13 surfaces will behave similarly on either side of the
14 river, depending on what surface you're looking at.
15 So, as an example, high terrace areas will behave
16 similarly within this reach. If you've done your
17 homework right and you understand the geomorphic
18 development of the surfaces in this area.

19 The transects that are located on here are
20 not just random. They're not spatially oriented by
21 coincidence. They are established based on changes in
22 these features. When we have the beginning of new
23 features or the change in the river feature cross
24 section changes, we typically have a new transect, and
25 you'll see in this example there's a transect at the

1 northwest part of the river. Here's another transect,
2 another transect, another transect, and another
3 transect. We've done that because we need to
4 understand how the surface is behaving at the beginning
5 or upstream part of the surface, and every time it
6 changes we have another transect to help us understand
7 how that part of the transect -- or that part of the
8 surface is working.

9 Transect sampling design. This is an
10 illustration, and we'll talk more about the colors that
11 are on here later in the presentation. But, for
12 illustration, this is the river, or this is a cross
13 section of the river landscape. Here's the approximate
14 water level, and you can see there's a series of
15 undulations. This undulation right here is a natural
16 levee. We have an intermediate terrace. We have the
17 historic natural levee or the pre-industrial levee.
18 High terrace, low terrace, and then you get into
19 wetland and low terrace again. Why different terrace
20 -- why the two low terraces? Well, proximity has a
21 major implication on how that surface is going to
22 develop based on different flood stages. Okay? So, a
23 low terrace adjacent to the river is going to behave
24 differently than a low terrace away from the river.
25 Elevationally they may be the same, but different flood

1 conditions will need to be in effect in order for the
2 water or the river to get to the outer terraces.

3 As I note, this illustration has been
4 vertically exaggerated. You're looking at **several**
5 **thousand feet, or** (delete) about 1500 feet from the
6 river bank to the edge of the scarp, so in order to see
7 subtle fluctuations in the terrain change, the vertical
8 exaggeration on this is at about 15%, so you can see
9 the subtle differences. We develop wonderful contour
10 **mapping** over this entire project area to help us be
11 able to extract those subtle surface changes, and for
12 **illustration** purposes, if we didn't do that you would
13 essentially see a pretty straight line, because the
14 scales that we're dealing with, if you're dealing with
15 1 or 2 foot of vertical change over 1500 feet, it would
16 be very difficult to see.

17 The general study objective, just is a kind
18 of a recap. The in-channel characterization was just
19 to provide a preliminary assessment of whether we had a
20 significant problem or we didn't have a significant
21 problem and, hence, the sample design and sample
22 density was developed to do that. The overbank
23 sampling design was to provide a detailed nature and
24 extent characterization of the overbank and
25 floodplained areas.

1 Just to kind of give you an idea the level of
2 effort from our field crew and from the laboratories.
3 The Upper Tittabawassee River site characterization
4 incorporated over 3800 analyses from more than 600 in-
5 channel and overbank sampling locations. I'm sorry,
6 3800 samples were collected. Of those 3800 samples,
7 3700 of them at the time of this presentation have been
8 analyzed. There's about 100 additional samples that
9 are in process or will be in process and there's only a
10 delay in those because of limited site access. That
11 information is going to be available shortly.

12 In addition to that, the field crews have
13 logged more than 7,000 man hours just as a function of
14 getting out and collecting the samples and doing the
15 field effort.

16 To present kind of an overview of the site
17 characterization, we've broken out, or we've talked
18 about the river reaches. Well, these river reaches
19 generally fall within three geomorphic settings. I'll
20 talk a little bit about what I mean by a setting.
21 We're grouping these based on major geomorphic features
22 or landscape features. There's really the upstream of
23 Dow dam area, the near-plant area is a second
24 geomorphic setting, and then the third geomorphic
25 setting is the natural river area. And we've done that

1 because the influences, the manmade influences, the
2 sheet piling or concrete walls and so forth in the
3 natural -- are not present in the natural area, but
4 they are definitely present in the upstream and near-
5 plant areas. So the upstream and near-plant area are
6 really highly industrialized or highly modified in
7 terms of the natural river progression and development.
8 For reference, this area is the Tridge, this is Reach
9 A, Reach B, Reach C, and Reach D is down here
10 (indicating). The colors, again, represent the
11 different surfaces. In this instance, the green, blue,
12 again wetlands and high terraces.

13 The upstream of Dow dam area. This is a graphic
14 to present what the overall assessment of the more than
15 200 samples, or roughly 200 samples from the upstream
16 of Dow dam area break down. Approximately 93% of them
17 fell within a concentration range of less than 100 ppt
18 TEQ. Roughly 2% are in the range of 100 to 1,000; 1%
19 are in the range of 1,000 to 5,000; 1% in the range of
20 5,000 to 15,000; and about 3% in the range of 15,000.
21 That 3% right there we're going to talk about later in
22 the PCAP areas. We have a PCAP in Reach D in
23 particular where these locations are that we will --
24 we've developed a plan to go and address these
25 sediments.

1 The near plant area goes from a high
2 industrialized or highly manmade or man-influenced area
3 into a transition area. You can see the surface
4 development here. There's a little bit more green,
5 there's some blue. You still have a lot of Dow
6 manufacturing on both sides of the river. We're
7 getting into the area where the Michigan -- or the MCV
8 property is, so it's still an industrial area, but the
9 natural landscape development is beginning to develop
10 here. The surface development is beginning to get a
11 little broader, though it's still generally pretty
12 minimal.

13 The near plant data breaks down this way:
14 79% of the data falls in the concentration range less
15 than 100 ppt TEQ, or almost 450 samples are less than
16 100 ppt TEQ; 19% are in the range of 100 to 1,000; 2%
17 between 1,000 and 5,000; less than 1% in the range of
18 5,000 to 15,000; and zero percent greater than 15,000.

19 The natural river setting I'm going to speak
20 a little bit more about because there's a lot more
21 here. The surface development is quite evolved.
22 There's a lot of manmade influences here in the way of
23 Gordonville Road bridge, Smith's Crossing, and a number
24 of tributaries. You can see this is an additional
25 example I referred to earlier in the Reach L and Reach

1 M area. We have mapped the geomorphic features, our
2 surfaces in here. These transects, or these sampling
3 locations, are actual sampling locations, not the
4 proposed sampling locations, and if you look at -- Al's
5 done a nice job and has a lot of the graphics up there,
6 you can look at them in large scale. These are all
7 color-coded based on the relative concentration within
8 each of these locations. We could spend a lot of time
9 going through each of these reaches and that's probably
10 beyond what we have in terms of time, so I'm going to
11 try and summarize it a little bit.

12 In the natural river setting there were more
13 than 1600 samples taken... about 62% of these were less
14 than 100 ppt. 20% of the data set was between 100 and
15 1,000; 11% between 1,000 and 5,000; 5% between 5,000
16 and 15,000; and about 2% that are actually greater than
17 15,000. Again, this is the natural river setting
18 portion of the project. Essentially from around where
19 Gordonville Road bridge is, it's actually a little bit
20 upstream from there, down through Reach O, or about a
21 mile and a half south of Smith's Crossing.

22 We then wanted to talk about what does the overall
23 data set look like. The overall data set looks like,
24 we've got somewhere be ~~-(delete)~~ about 2500 samples,
25 with about 66% of the data set less than 100 ppt TEQ;

1 19% is between 100 and 1,000; 9% is between 1,000 and
2 5,000; 4% between 5,000 and 15,000; and the over data
3 set there's about 2% of this greater than 15,000.
4 Well, you can say okay, well, wait a minute. What does
5 this all mean? Well, the GeoMorph-based sample design
6 really is a near-river sample density or sample intense
7 density, so as you move away from the river there's
8 actually fewer samples as you move away from the river
9 than there are where we actually found the bulk of the
10 contaminants, or where the natural levees have been
11 **accumulating** for a number of years. So this is a
12 pretty good story, actually, and we're going to talk
13 about some of the PCAPs that we've identified
14 specifically for a number of these areas.

15 Typical concentration profile in the natural
16 river setting. Again, this is the same illustration **I**
17 **showed earlier**, but I'm going to talk to the colors
18 here this time versus just the surfaces. The natural
19 levees or the post-industrial natural levees, this area
20 right here (indicating), is where the majority of the
21 contamination has been found. It is it at -- the
22 highest concentrations are at depth, so if you look at
23 this dark color and orange, we have -- that's where the
24 highest concentrations were identified. As you move up
25 the profile or closer to the surface, the

1 concentrations decrease. They go to yellow or green,
2 and as you move deeper, the concentrations decrease,
3 really defining a **very** finite or a definite period of
4 time that these materials were deposited in here.

5 The historic natural levee, or the pre-
6 industrial levee, you can see there's a lot of dark
7 green at the bottom. These areas are limited in terms
8 of contaminants to the upper layers and the sediment
9 thicknesses are generally in a range of one to two feet
10 in the pre-industrial levee, so you can kind of think
11 of it as a wedge. The area next to the river is pretty
12 broad, but pretty narrow, and then it's a wedge as you
13 move away from the river.

14 The second area that we found some
15 contamination at the surface in the range of one to
16 three feet is in the wetland or low terrace areas
17 adjacent to the natural levees. The important thing to
18 look at is as you move away from the river or look at
19 the issue or the factor or proximity, the
20 concentrations go from orange, and yellow, and red, to
21 generally green and light green. So, the surface
22 development as you -- or the sediment development or
23 the soil development in the areas away from the river
24 are generally pretty limited, and as you move out
25 towards the edge of the scarp or the high walls in the

1 upland or high terrace areas, the thickness -- the
2 sediment thicknesses are generally less than a half a
3 foot in thickness.

4 General findings for the GeoMorph site
5 characterization. The Upper Tittabawassee GeoMorph
6 site characterization was approved on a pilot scale.
7 We've confirmed the effectiveness of the GeoMorph
8 process as an effective tool for delineating and
9 identifying the nature and extent of contamination of
10 dioxins and furans on the Tittabawassee River. We've
11 also identified a number of impacts of manmade
12 structures, including dams, bridges, and a number of
13 other things, sheet piling, and concrete walls, and
14 bank stabilization. We've detected a very limited
15 number of other chemicals. We've done some broad
16 screen analysis on a limited number of samples looking
17 for a large list of other constituents. And for a site
18 of this age, remarkably there was not as many as one
19 would think.

20 Floodplain areas of the UTR have been
21 sufficiently characterized to establish really two
22 things; the majority of the contamination occurs in
23 buried deposits in the post-industrial levees, which
24 are the levees ~~right (delete)~~ immediately adjacent to
25 the river, as well as the areas adjacent those

1 wetlands, so it's a relatively narrow area adjacent to
2 the river where the majority of the contamination has
3 been identified. As you move away from there, you
4 increasingly go to low concentrations and low sediment
5 thicknesses, so the concentrations drop off
6 significantly as you move away from the river and up
7 and out of the floodplain.

8 I'm going to talk a little bit about pilot
9 corrective actions. The site characterization has
10 identified some areas where we'll be initiating some
11 pilot corrective actions. In the fall of this last
12 year we gave a high level overview of what were the
13 concepts behind some of the pilot corrective action
14 technologies that we'll be evaluating. And why I say
15 evaluating, we've got a wonderful river. We've got a
16 great ecological habitat and we've got a world class
17 walleye fishery here. There are unintended
18 consequences, just like when the initial dams were put
19 in many, many, many, many years ago and changed the
20 channel width and modified the flow characteristics,
21 nobody intended to do that, but that was an unintended
22 consequence, so doing the wrong thing for the right
23 reason can provide other unintended consequences, so
24 it's a complicated river system and we need to properly
25 think about all aspects of things that we're going to

1 do and make sure that whatever solution or remedy we
2 put forth is not worse than what we currently have.
3 You can create more problems in the process of trying
4 to fix them. So that's an important theme as we begin
5 talking about pilot corrective actions.

6 In particular, I'm going to talk about the
7 Reach D, and early on when we talked about the upstream
8 of Dow dam area and that 3%, those red areas, all of
9 those fall within a very specific area in Reach D.
10 We've got a pilot corrective action that we're going to
11 describe in more detail tonight to address that area.
12 In addition to that, there is the Reach O area that we
13 will begin talking a little bit about or give you a
14 better understanding of what our plans are for the
15 Reach O area.

16 PCAP goals. Really there's a couple of really
17 simple goals. We want to manage erosion and movement;
18 both for low flow, as well as high flow conditions.
19 It's important, again, to not have unintended
20 consequences of whatever decision or whatever remedy
21 is put forth. In addition to that, we want to access
22 technology alternatives for long-term strategies. How
23 amenable are these pilot scale implementations
24 scalable to larger or long-term solutions? Ultimately
25 your short-term implementation would be a long-term

1 remedy. That would be the ideal scenario and there
2 wouldn't be much in the way of unintended
3 consequences. The number of PCAP considerations or
4 Pilot Corrective Action Plan considerations need to be
5 properly thought out. As many of you know, given the
6 subzero weather, working on the Tittabawassee River in
7 the months of January and February, especially this
8 year, is not only not conducive to construction, but
9 it doesn't really provide very safe work environment.
10 Normal construction activities that you could proceed
11 moving forward with in June, July, and August, are
12 generally not achievable under these kinds of
13 conditions. So, having a thorough understanding of
14 the work conditions and how those relate to the safe
15 work conditions for our personnel and people is an
16 important consideration as we move forward on pilot
17 corrective actions.

18 Minimizing adverse habitat and wildlife
19 impacts. We've talked about the world class walleye
20 fisheries. I love fishing. I'm sure many of you in
21 here like to fish. This is a great fisheries habitat.
22 Going in there and changing the river system such that
23 we decrease the walleye fisheries habitat wouldn't be
24 anything that any of us would want, so we need to keep
25 that in our mind as we put forth solutions or pilot

1 solutions in these areas.

2 In addition to that, we've got a wonderful
3 ecological habitat. There's nesting bald eagles,
4 there's great horned owls, and there's a wonderful
5 ecological MSU study that's presently under way to
6 really give us a lot better understanding of what
7 impacts are there, if any, to the ecological
8 environment. The last thing we want to do is **impact**
9 that adversely.

10 We need to define the extent of the in-
11 channel deposits. I had told you we did a preliminary
12 assessment of the in-channel characterization for the
13 Upper Tittabawassee. We've identified some areas that
14 we will go out and provide a further or more detailed
15 analysis of the in-channel sediments. That's
16 something that we will be doing in the coming months

17 Permitting. Most everything we're going to
18 be doing on the river requires permits. Either from
19 the state or from the Army Corps of Engineers, but
20 there's a permitting process, a formal permitting
21 process that we can't overlook and there are time
22 frames associated with that. So, keeping that in mind
23 as we put forth our considerations for pilot projects
24 is an important element.

25 We need to really finalize, also, the soil

1 and sediment handling plan and where these materials
2 are going to go. What is the quantity and where are
3 they going to go? That needs to be finalized before
4 we go out there and start removing materials. We need
5 to select appropriate remedial technologies. This
6 ties back in many instances to the unintended
7 consequences. Being on a river, a very flashy river,
8 at the wrong time of the year with the wrong equipment
9 can provide devastating unintended consequences for
10 human health, as well as for the ecology in the area.
11 The last thing we want to do is release materials
12 downstream in the process of trying to clean them up.

13 We also need to develop a monitoring plan to
14 really measure the impact and the effectiveness of the
15 remedies that we're putting forth. A solution is only
16 as good as if you can monitor how effective it has
17 been in a short-term or long-term nature.

18 Reach D. For reference, this area right here
19 (indicating) is the Dow dam. We have a Dow
20 manufacturing facility on this side and also on this
21 side. Reach D, the area that we focus the PCAP for
22 Reach D is bound by the red area. This area is an
23 off-channel area. It is bound on the west and on the
24 east by sheet piling, or a steel wall. The deposits
25 within that area, you have concentrations 68,000 ppt

1 TEQ and it's something that we're going to be taking
2 care of in the coming months. It is a stable deposit.
3 It's been there for a while. Again, it is stable. It
4 is bound on the west and on the east by sheet piling
5 that has been there for some time.

6 Reach D overview. We need to define the
7 lateral and vertical extent of deposit, how far to the
8 north and how far to the south, determine the
9 continuity of the outer sheet piling. That's
10 important for whatever solution we're going to put
11 forth in there. We need to understand that if we go
12 in there and remove the materials, if these -- the
13 sheet piling has been there for 40 years its
14 structural integrity may be compromised, so that needs
15 to be factored in there so that we can provide a
16 buffer so that wall -- that sheet piling wall doesn't
17 collapse or we have a problem in the process of
18 working in that area. We install sheet piling or a
19 coffer dam around this area so that we can properly
20 work in this area. This is a riverine setting and we
21 have to be able to account for flood conditions. This
22 river is very flashy and it can move up a lot and down
23 a lot in a relatively short period of time.
24 Ultimately you're either going to remove either by
25 hydraulic or mechanical methods this deposit in Reach

1 D.

2 Reach O area is an area at the end of the
3 study. This is a manmade tributary and I don't know
4 how well you can see this, but this area right here is
5 the deposit which 87,000 ppt TEQ concentration was
6 identified. This is a net depositional deposit and I
7 say net depositional because it has been accumulating
8 over time. The deposit that had the elevated
9 concentrations are at depth, it's not at the surface.
10 There's about a half a foot of what I refer to, or
11 what we refer to in the trade, as a poorly sorted, or
12 a depositional type sediment on top. It's about a
13 half a foot in thickness and below that is this layer
14 that contains the elevated concentrations. Below that
15 we get into a more silty loam and then ultimately get
16 into the lacustrine silt. The important thing to note
17 is this deposit that is at depth, we believe is more
18 than 75 years old. It's been here for a while, and it
19 is stable under flow conditions that have been modeled
20 up to the 100-year storm, or the 1986 storm. So we
21 need to address this, but we need to address it
22 properly. Again, unintended consequences can be
23 devastating, not only to this area, but also
24 downstream.

25 Reach O overview. We need to collect some

1 precision mapping. We need to understand the extent
2 of this deposit. How big is it; where is it at, so
3 that we can properly put together a plan to go address
4 it. We need to define the lateral and vertical extent
5 of that in-channel deposit. We need to characterize
6 the sediments for disposal ultimately and find out
7 where it's going to ultimately go. Ultimately we're
8 going to remove the in-channel deposit by either
9 hydraulic dredging with a silt curtain, or mechanical
10 removal with a coffer dam. Reaches K, L, M, and N,
11 are also areas that will be focusing some PCAP
12 activities. Presently there's a number of low flow
13 and high flow alternatives that are being evaluated
14 collaboratively with the DEQ. We're on a very
15 aggressive time frame. Frankly, the site
16 characterization report was submitted last week and
17 we're already talking about how we're going to address
18 these things. We have a very aggressive schedule that
19 we will be putting together plans and submitting those
20 and reviewing those collectively with the DEQ in the
21 coming weeks.

22 Alternatives under consideration for these
23 reaches include management in place for certain select
24 areas, if appropriate, all the way to removal. I've
25 got a couple of examples that I'm going to show you of

1 some of the kinds of concepts related to some of the
2 management kinds of controls that have been used at
3 other sites to help, again, control and use the
4 river's energy in a net beneficial way. If we have
5 eroding banks there are ways to control that so that
6 they're not eroding. If we have dams -- or, I'm
7 sorry, if we have bridges that are in the way that are
8 causing depositional areas or eroding, there's ways to
9 address those things, too.

10 These are some examples of some low flow
11 controls. This is some concrete, broken concrete,
12 that somebody has placed to really control at the
13 water level or the foot of the bank low flow kinds of
14 erosions.

15 This is an example of a cross vane. This has
16 a lot of pretty interesting benefits, especially for
17 those that like to fish. This is a low flow cross
18 vane that is installed within the river system to
19 redirect or rechannelize the energy of the river
20 towards the center of the river. The benefit, if you
21 can see down here, this little area ends up being a
22 hole. It ends up being a fish hole as a function of
23 moving the river's energy towards the center. As it
24 tops over these rocks, or boulders, or concrete,
25 however it's constructed, it actually erodes and

1 creates a fish pocket. The walleye typically in these
2 kinds of scenarios love this kind of solution.

3 Example of high flow control can be combined
4 with some bank, or terrace, or in this instance a
5 natural levee removal increasing the channel cross
6 section and putting in some flow controls at the
7 bottom to, again, redirect the energy of the river
8 away from the banks and towards the center of the
9 river.

10 PCAP process. Plan developed is in progress.
11 We'll be submitting in the coming days a plan for
12 Reach D, Reach O, and the other reaches. Permit
13 application process is underway. Agency approval for
14 both PCAPs and permits are necessary. Really, the
15 collective goal is to complete the pilot work during
16 this 2007 construction season.

17 Thank you.

18 CHUCK NELSON: Why don't you stay. I think
19 there might be a question.

20 Are there questions? Please got the mike,
21 and go ahead.

22 AUDIENCE MEMBER: My name is Donald Matlock.
23 I have a question. In the report it states that 3 to
24 6 inches of the sand protects or armors the really
25 high concentrations of dioxin found from 6 inches to

1 12 inches. Why should we believe that?

2 MR. SIMON: In many of these areas if you
3 look at the depositional or the net depositional
4 setting of these things, these deposits, based on the
5 chemical fingerprint or signature of these things, if
6 you're speaking in particular of in-channel, have been
7 there for quite some period of time and there's a
8 number of things that we've looked at in terms of
9 looking at the sheer stress, or the amount of force at
10 that surface to provide insight as to how erosive
11 those areas are. These are depositional settings,
12 that's why the deposits are there, and if they weren't
13 depositional settings they would be long gone.

14 CHUCK NELSON: Other questions?

15 AUDIENCE MEMBER: My name is John Wituckey
16 (ph), I'm from Bay City. If they're depositional
17 settings, why are they in the Saginaw Bay? We didn't
18 dump any in the Saginaw Bay. Dow Chemical dumped it
19 in the Tittabawassee River.

20 MR. SIMON: The areas that we've identified,
21 the Upper Tittabawassee River are, in fact,
22 depositional or they would have been in Saginaw Bay.

23 AUDIENCE MEMBER: Some of it is.

24 MR. SIMON: I can't speak to Saginaw Bay.
25 The areas that we've identified --

1 AUDIENCE MEMBER: You've got the leftovers.
2 CHUCK NELSON: John?
3 AUDIENCE MEMBER: John Witzke, Michigan
4 United Conservation Clubs. I believe the tail end of
5 your presentation was detailed in the area of the old
6 west side power house, am I correct in that, where
7 you're going to -- am I correct in that, sir?
8 MR. SIMON: Could you state -- I'm -- the old
9 power house?
10 AUDIENCE MEMBER: Yeah, that area that you
11 want to coffer dam, I believe that was on the west
12 side of the river, am I correct?
13 MR. SIMON: That's on the east side of the
14 river.
15 AUDIENCE MEMBER: On the east side of the
16 river?
17 MR. SIMON: The Reach D corrective action --
18 AUDIENCE MEMBER: I wish really that you
19 could have been a little bit more detailed, because
20 people that aren't familiar with the plant and the
21 river, it doesn't make too much sense at all.
22 I'd like to address the DEQ. Jim, have you
23 folks had a preview of the presentation that GeoMorph
24 has presented tonight? Have you reviewed this before?
25 JIM SYGO: We just received the report

1 February 1st. We're still reviewing the report in its
2 entirety. We have seen data as it's been coming in
3 but, you know, we haven't formed any conclusions on
4 the report yet, but one of the items we're looking at
5 is whether or not utilizing GeoMorph in this pilot
6 type of setting as we've done in the first 6-1/2 miles
7 is an acceptable process to be using further
8 downstream.

9 JOHN WITZKE: I think it would be great, you
10 know, if you folks were up to date on what the Dow
11 people have presented so we could get some intelligent
12 response over the presentation.

13 MR. SYGO: And if you have specific
14 questions, I'm not as updated, but I know Al Taylor
15 has been looking at this report the last seven days
16 anyway, so Al may be able to answer some of your
17 questions if you have questions.

18 JOHN WITZKE: Fine. Thanks, Jim.

19 CHUCK NELSON: Any other questions on this
20 presentation before we go on? There will still be
21 other opportunities to talk about this at the end.
22 So, go ahead, sir.

23 AUDIENCE MEMBER: Hi, my name is John
24 Smillie. I live near the 87,000 parts per trillion
25 site. Could you tell me if the samples that were

1 taken, was that below the water surface, or was that
2 on the banks?

3 MR. SIMON: That was below the -- those were
4 in-channel sediments.

5 JOHN SMILLIE: In-channel?

6 MR. SIMON: Yeah, that was below the water
7 surface.

8 JOHN SMILLIE: So I guess the action would be
9 then to kind of dam the water and remove the sediment
10 and then either fill the area back up or hasn't that
11 gone that far?

12 MR. SIMON: Those are all -- that is
13 definitely an option, leaving it open, but removing
14 the sediments and leaving it essentially a hole may be
15 another option. There are some advantages in doing
16 that. Putting some capping in there. There's a
17 number of ultimate goals that are presently being
18 evaluated and ultimately we will have a plan that will
19 be in that level of detail that will be available.

20 JOHN SMILLIE: Does that seem to be on the
21 east side of the river or the west side of the river?

22 MR. SIMON: That's the -- what would be the
23 east side of the river.

24 JOHN SMILLIE: East side of the river? All
25 right. Thank you.

1 CHUCK NELSON: Any other questions on this
2 presentation?

3 Seeing none, let's see if we can move ahead
4 to the Remedial Investigation Work Plan review
5 process. John, you've got a little intro, and then Al
6 will be on.

7 GREG COCHRAN: Hello everybody. My name is
8 Greg Cochran, and as I was introduced earlier, I'm the
9 Director for Dow Chemical that's responsible for this
10 issue.

11 First of all, as John said earlier, I do want
12 to thank you for coming out tonight. I know that this
13 is valuable time for you and I appreciate you being
14 here. I also know that many of you here based on your
15 questions and your comments, you're here to hear about
16 progress, and we understand that. One of the things I
17 want to do before Al speaks is talk about the progress
18 that we've made in the RIWP (Remedial Investigation
19 Work Plan) submittals that Al's going to talk about in
20 much more detail.

21 Basically what I want you to understand about
22 those plans that they are new plans. They were
23 submitted on December 1st, 2006. Those plans were
24 developed working cooperatively with DEQ and they do
25 have a new target completion date of 2010.

1 To rewind the clock just a bit, I want to
2 remind you of something. The framework agreement that
3 was envisioned back in 2005, that agreement envisioned
4 that Dow and DEQ would work cooperatively on a
5 comprehensive resolution package for all the claims
6 associated with Dow's historic releases from this
7 site. These claims involve multiple levels of
8 regulation. First of all, let me just say this, that
9 the potential claims included the regulatory
10 obligations under Dow's Part 111 operating license,
11 they include the potential cleanup claims from
12 Superfund activities, and they also include potential
13 claims from natural resource damages. The framework
14 also envisioned a group of folks working together
15 under the alternative dispute resolution process,
16 involving Dow, of course, and all state and federal
17 trustees, in working towards resolution. That group
18 is also working on a very similar plan of 2010. A key
19 part of the resolution that you're hearing about
20 tonight is around the regulatory matters under our
21 operating license. Okay? Again, that plan was
22 submitted on December 1st, 2006, and it is a new plan.

23 Now, very quickly and I'll be done. This
24 plan is aggressive. It requires much more involvement
25 than just the Dow Chemical which I know you

1 understand. It will take close cooperation working
2 with MDEQ, with the EPA, with the public, and
3 especially with property owners. Many of you which --
4 of which are property owners and you've allowed us
5 access to your property for taking samples, for which
6 we thank you.

7 There are many challenges to meeting the
8 schedule that we've proposed. It will take innovative
9 ideas, creative ideas, and innovative approaches, much
10 like what you heard tonight regarding the GeoMorph
11 process. That is an innovative approach, and it is
12 one that's helping us accelerate our plan. We've seen
13 evidence of that in 2006. We will continue to see
14 evidence of that going forward.

15 Finally, let me just say this: I understand
16 this completely, that it's not about a great plan,
17 it's about a great plan being implemented and results
18 and we do understand that. Dow is firmly committed to
19 this 2010 plan, and that's my message. And I thank
20 you for your time. Al?

21 AL TAYLOR: Good evening, my name is Al
22 Taylor. I'm one member of a team of technical folks
23 working on the river issue and the City of Midland
24 soils issue. I work with Cheryl Howe who's in the
25 back, Deb MacKenzie-Taylor, Virginia Hemmick, Dee

1 Montgomery, and about four or five other people that
2 probably don't have to attend these meetings too
3 often.

4 What I'd like to do right now is very quickly
5 just give you an update on where we are with respect t
6 Remedial Investigation Work Plans that Greg Cochran
7 just mentioned. We have two of them that are actively
8 in review and that we are actively reviewing with Dow
9 and negotiating with Dow on. They are the
10 Tittabawassee River Work Plan, a big component of
11 which Peter Simon just spoke about in terms of the
12 GeoMorph pilot study, and the City of Midland Soils
13 Plan, something that we haven't talked yet about
14 tonight, and we'll get into that in a little bit.
15 Once these plans are approved they become enforceable
16 as part of Dow's Part 111 operating license, so they
17 are important, they're kind of like for the Hazardous
18 Waste Corrective Action Program, they're kind of like
19 the AWAC (sic) that's going to be flying around and
20 controlling all the activities. If it's in the plan,
21 that's kind of the road map for how things move
22 forward.

23 We are right now investing a lot of effort,
24 both on Dow's side, the DEQ's side, Michigan
25 Department of Community Health, the Fish & Wildlife

1 Service, the Chippewa Indian Tribe, and a number of
2 technical working meetings. Typically these meetings
3 go all day where you sit down around the table and get
4 to resolution on a lot of very tough issues. This is
5 a very large project and it takes a lot of cooperation
6 from all parties to move forward.

7 As Greg mentioned, the RIWP or Remedial
8 Investigation Work Plans, if I slip into acronyms, I'm
9 sorry, I'm a government employee, so that's kind of
10 our stock and trade. The revised RIWPs are generally
11 consistent with agency expectations. Last year at
12 this time we had RIWPs that we were having a hard time
13 getting behind. It did not, we believed, do not -- or
14 they were not going to do what we believed needed to
15 be done. We are much more comfortable with this set
16 of RIWPs and we believe we're going to get to a point
17 in the approval process, we're going to get to
18 approval. We still have some significant obstacles to
19 overcome, principally with Human Health Risk
20 Assessment process. We have meetings scheduled into
21 the summer to address Human Health Risk Assessment
22 issues. We also are going to be engaging a scientific
23 advisory panel to help us through with those processes
24 and to help us through with some of the more
25 contentious issues.

1 Just want to jump back a little bit to some
2 of the things that Peter discussed. The Pilot
3 Corrective Action Plan was submitted by Dow in late
4 December for conducting what we call interim response
5 activities or Dow's calling Pilot Corrective Action
6 Activities. We're considering them essentially equal.
7 We are in the process of folding these PCAP IRAs,
8 these Pilot Corrective Action activities into the
9 remedial investigation work plan. That is a good
10 thing in a number of ways. What we want to do is as
11 we go forward with the investigation over the next
12 several years as we run across more of these areas,
13 high levels of contamination that need to be addressed
14 sooner rather than later in the process, we want to
15 have a defined process for addressing those. We want
16 to have objective criteria for going out and saying,
17 okay, if we find elevated levels in this kind of
18 condition we're going to take care of them. We need a
19 way to make the decision, are we going to take care of
20 it now or later as part of the overall remediation
21 process. Basically, as we go through that process and
22 we develop this process which I think we're going to
23 be spending a lot of time on over the next month,
24 we're going to be asking a number of questions and
25 we're probably going to come up with a number of

1 different criteria, but mainly we're going to be
2 boiling it down to how is the property being used
3 right now. For example, if it's a residential
4 property or people are living on it, we'll probably
5 look at it different than if it's a flooded low land
6 that doesn't get a lot of human exposure. We're not
7 trying to neglect the ecological risk issues, but we
8 are trying to prioritize. We're going to be looking
9 at how high concentrations are and how much of it's
10 there. Is the high concentrations, are they exposed,
11 or are they likely to be exposed in the future? And,
12 are they stable or unstable, and can we tell with any
13 kind of confidence.

14 A gentleman asked a question about is three
15 to six inches of sand in the river, is that, you know,
16 an effective cap material. In my opinion, probably
17 not, you know, these are areas we're going to have
18 some disagreement; however, we're moving forward to
19 address it as an IRA. It may be an effective cap
20 under some conditions, however, we have to be
21 concerned about the conditions where ice rafting may
22 plow through there, a tree comes down changes
23 conditions, so these are all -- this is all a balance
24 that we're going to have to work through.

25 One thing that's critical to address here is

1 we need to continue to move forward with a detailed
2 technical characterization of the river and
3 floodplain. The reason we know about these high areas
4 right now is we went ahead and we started collecting
5 data and we implemented the work plan. That's
6 something that we're going to have to do and continue
7 to do. As Peter indicated, we haven't done the
8 detailed in-channel characterization yet. We're
9 probably going to find more material in there that
10 we're going to have to address as we go through that
11 process. We need to get to the rest of the 18 miles
12 of the Tittabawassee River, as well. So we're going
13 to have to walk a line between how much remediation
14 are we going to try and accomplish in an interim
15 response manner versus show much we're going to try
16 and get to the whole picture, so that's something that
17 we are going to continually struggle with throughout
18 this process and we're going to have to ask for your
19 patience on it.

20 Okay, jumping back to the Tittabawassee River
21 RIWP, the report that Peter just indicated was
22 submitted actually, I think, last Thursday, the data
23 is being used to inform future investigations. We
24 think it's a pretty efficient and effective way to
25 characterize a problem of the magnitude that we're

1 looking at here. Twenty-two miles of river, you know,
2 hundreds of yards wide, it's not -- it's not the kind
3 of problem that allows for the kind of
4 characterization we'd normally do in someone's back
5 yard where we're taking nine samples per quarter acre.
6 We're going to have to be more efficient and we're
7 going to have to be innovative, as Gregg indicated.
8 This plan is currently under review by the DEQ to see
9 whether it's applicable to the remainder of the river.
10 We think it probably is. We've got some issues we
11 have to work through on it, but by and large, and I
12 have to confess my bias as a geologist, this is the
13 way I would look at it, as well. It's a -- we think
14 that you can reasonably predict concentrations using
15 this method.

16 One thing that's going to be happening this
17 year that we definitely need to get done, the Priority
18 1, Priority 2, residential and agriculture properties
19 are going to get samples using the GeoMorph process,
20 hopefully, and also we're going to be using perhaps
21 some additional sampling to make sure that the level
22 of characterization done by GeoMorph is applicable to
23 those areas where people are living, because you need
24 a higher level of confidence in those kinds of
25 situations.

1 Characterization of the Upper Saginaw and any
2 remaining Tittabawassee River we're going to try to
3 complete in 2008. I think one of the things that I
4 just want to jump back on that Peter mentioned in
5 terms of characterization. We have looked for dioxins
6 and furans. We've looked for something called EPA
7 Appendix 9 parameters which are pretty much the
8 standard list of parameters (chemical compounds).
9 It's a pretty extensive list, but also there's another
10 level that we're going to here, which is a lot of
11 people have spent a lot of time, especially our
12 toxicologists on, and chemists from ATS and from Dow
13 on developing a list of chemicals that are specific to
14 Dow that may have been released historically. So that
15 level of effort is going to have to go into the
16 characterization that's already been done. So there
17 is going to be another level of chemical
18 characterization conducted.

19 Sampling this year will also be conducted to
20 support the human health and ecological risk
21 assessments. We're going to be continuing to work on
22 a Human Health Risk Assessment, another what we call
23 placeholder issues. These are the things that we
24 haven't gotten to agreement on and that we're going to
25 have to sit around the table and work on -- or until

1 we get them fixed. We're going to be spending a lot
2 of time on these Pilot Corrective Action activities
3 and getting these incorporated into the enforceable
4 operating license. And, as probably the most critical
5 thing we could do right now, is make sure we don't get
6 **distracted**. We need to continue forward with the
7 investigation process to get the rest of the 18 miles
8 of the Tittabawassee River characterized, finish the
9 detailed characterization of the in-channel sediments
10 on the Tittabawassee River, because we are going to
11 find additional areas that need to be addressed.

12 Very quickly, with respect to the Midland
13 Remedial Investigation Work Plan, the investigation
14 schedule hinges upon the development of the site-
15 specific direct contact criteria. That's one of the
16 things the Human Health Risk Assessment people are
17 working on. This is a bit backwards. Typically you
18 would get the data first and then using the data you
19 would develop your criteria. It's not working out
20 that way in this case because of a number of reasons
21 that we don't have to get into, but it significantly
22 complicates the process. As part of this process,
23 samples have been taken in the City of Midland over
24 the fall and early winter. Samples for dioxins and
25 furans and other contaminants have been analyzed. We

1 have some of the dioxin and furan data back. We have
2 some of the other contaminant data back and that's
3 going to be available in early to mid March and that's
4 probably something that will be a big part of the
5 discussion when we get together in May. Just in
6 general for the dioxin and furan data, I don't think
7 we've seen any real big surprises. With that we have
8 some data gaps that we're going to need to fill.

9 Just another point that needs to be made.
10 With respect to the City of Midland in particular,
11 this is the first new data that's been collected in
12 about the last 10 years. This is a big step forward.
13 It may not seem like a lot by collecting these 400 --
14 or 300 to 400 samples in residential areas, is a huge
15 step forward. We've been stalled on this for a very
16 long time, so we're very pleased that that process is
17 moving forward as we are pleased that detailed data
18 collection is occurring on the Upper Tittabawassee
19 River. This is a tremendous amount of progress in the
20 last 8 months or so.

21 During 2007, while the Human Health Risk
22 Assessment people are working on coming up with a
23 direct contact criteria, CH2M HILL is going to be
24 doing detailed land use mapping, to figure out how
25 people are actually using property in the City of

1 Midland because the direct contact criteria that are
2 being developed will be applicable to different land
3 uses. Additional sampling will be scheduled for 2008
4 after the development of that criteria.

5 Just with respect -- just another note in
6 respect to the list of contaminants that's being
7 looked at in the City of Midland, right now we've
8 looked at kind of a standard list and dioxins and
9 furans. The same type of process that's been gone
10 through on the Tittabawassee River in terms of looking
11 for Dow-specific contaminants is also being gone
12 through on the City of Midland, so there'll be another
13 layer of chemical analysis that's going to be going on
14 to make sure that, you know, we've identified, at
15 least to the best of our ability at this pint in time,
16 those contaminants that we need to be concerned about.
17 And, hopefully, we're not going to find much more, but
18 this is the time we look. This is part of the remedial
19 investigation process.

20 Again, in Midland, there'll be some possible
21 additional sampling to support human health and
22 ecological risk assessments this year and continuing
23 work on the HHRA or the Human Health Risk Assessment.
24 And that's really all I had to get through other than
25 -- I forgot I had this slide. I'm sorry.

1 Just to give you an idea what we're going to
2 be doing over the short term, our goals here are --
3 I'm sorry about that -- have sufficient approval to
4 move forward with time critical field activities for
5 the Tittabawassee River in March. That's going to --
6 that's a very aggressive schedule to get through the
7 types of reviews and get the types of approvals we
8 need to get done. It's going to take a lot of work
9 and a lot of cooperation from both sides of the table
10 to get there. It requires approval of the pilot
11 GeoMorph characterization. We're going to have to
12 continue to work on the Pilot Corrective Action Plan
13 interim response activities. We're getting a lot of
14 tremendous support from the Land and Water Management
15 Division and the Army Corps of Engineers on that, and
16 we're probably going to need MDPS permitting -- water
17 permitting, from the Water Bureau of the DEQ.

18 One of the other tasks that we have before us
19 is developing in a collaborative manner the sampling
20 and analysis plan for the middle and lower
21 Tittabawassee Rivers for implementation yet this year.
22 And that's got to be done and so they're ready to be
23 in the field by really late May or June. **Last** year a
24 very late start was gotten on this process in actually
25 getting people into the field and we're still

1 suffering the consequences of that, because data
2 interpretation is lagging behind the need to get
3 decisions made, and so hopefully that's going to be --
4 that's going to be fixed this next year.

5 And that really is my last line. Thank you.

6 CHUCK NELSON: Okay. We are at that stage
7 where it's time for questions and discussions. I
8 would note first that Cheryl passed me a note to say
9 that she has limited copies of a CD of the GeoMorph
10 report, so if you would like a copy on CD where you
11 can read the whole report, not just what did I
12 remember from a PowerPoint or just the PowerPoint,
13 please see Cheryl and she will happily give you one if
14 she has it, and I assume we have a way to take
15 information from you and get you one if you didn't
16 have one available for you now.

17 So, sir? Begin, please.

18 AUDIENCE MEMBER: In the KL reach right
19 beside Gordonville Road, I can remember property that
20 used to flood real bad when I was a kid and then they
21 put the bridge in, and after they put the bridge in,
22 whoever owned the property, started filling it. And I
23 don't see any sampling in that area, and at times I've
24 heard they want to put a trailer park in there. So if
25 they were to start to dig the lines in there,

1 shouldn't that be sampled?

2 AL TAYLOR: I think this is going to be a
3 joint response here. You're talking about --

4
5 AL TAYLOR: Okay. You're talking about the
6 area that's just downstream of Gordonville Road bridge
7 there?

8 AUDIENCE MEMBER: Yes. It's in between the
9 river and Saginaw Road.

10 AL TAYLOR: On the east side.

11 AUDIENCE MEMBER: I don't know my directions
12 right there, because the road curves.

13 AL TAYLOR: Right. But it's just -- if you
14 go past going south --

15 AUDIENCE MEMBER: Over the bridge and it's on
16 the right-hand side.

17 AL TAYLOR: You're right. There are no
18 samples there. That's a property that did not grant
19 access for the characterization. The property owner
20 refused.

21 AUDIENCE MEMBER: Which was probably
22 commercial and if it's developed in the future, how do
23 we respect his rights, you know, that no, you know, if
24 they start digging, uh --

25 AL TAYLOR: It's a data gap that's going to

1 have to get filled one way or the other. Under Part
2 111, Dow has an obligation to use something called
3 best efforts to gain access to the property to conduct
4 sampling. At this point that probably hasn't occurred
5 yet, but that is one of the things that we'll be
6 working on with Dow over the next year or so. But
7 that's an important area to collect data in. We
8 agree.

9 AUDIENCE MEMBER: Yeah, because if you're
10 having higher levels downstream, there's no sense in
11 starting to clean this up if we have a pocket in
12 there.

13 AL TAYLOR: Yep. We agree.

14 AUDIENCE MEMBER: Bill Egerer with Midland
15 Matters. I think Al might be the most appropriate one
16 to answer this. I have two or three questions,
17 they're short, they're inner-related. It's all about
18 human exposure and evaluating the different
19 remediation options with the new information you have.
20 First off, I want to compliment you on the format of
21 the meeting and all the documents on line. I mean
22 there's a wealth of information there and I know for a
23 fact there's a lot of people not here tonight because
24 they can access it on line, so that's a good point.

25 My first question is: Where is the

1 scientific study and reporting that evaluates the
2 various remediation options? There was talk about ATS
3 evaluating different options and I'd like to know
4 where those studies are and/or will they be on line.

5 The second question related to what is the
6 standard, or the desired goal, for evaluating the
7 different remediation options? For instance the U of
8 M exposure study clearly showed that the current and
9 untouched river system resulted in nearly zero
10 exposure after decades, maybe 50 to 100 years of some
11 level of contamination. Is that the standard we're
12 going against? That's the question.

13 And the last one is: What are the factors
14 that are included when you evaluate options?
15 Obviously there's a lot of those geo hydrological
16 factors, but what about factors of costs, economics,
17 public perception? So these are all inner related to
18 human exposure and evaluation of remediation options.

19 AL TAYLOR: Okay. You want to refresh me
20 with your first question? I remember the second two.

21 AUDIENCE MEMBER: Okay. Fair enough, Al.

22 CHUCK NELSON: Just do one at a time.
23 That'll be wise.

24 AUDIENCE MEMBER: The first one was: You
25 said that there's evaluation of different remediations

1 and options going on anywhere from maybe nothing to
2 complete removal. Where are those studies, and I'm
3 assuming they're scientific-based. I know where the
4 U of M study is, but where are the studies that are
5 going on now as these options get evaluated?

6 AL TAYLOR: I think this is going to be a
7 tag-team kind of response, but I'll take the first
8 shot of it.

9 First of all, as part of this PCAP IRA
10 process, a number of different techniques that are
11 kind of standard remedial techniques are going to be
12 evaluated and then some will be selected and applied
13 on a pilot basis to the Upper Tittabawassee River.
14 And we'll be collecting data during that application
15 to determine how effective or ineffective they are.
16 And of the other factors that you were talking about
17 in terms of, you know, the economics of it, that type
18 of thing, those would also be considerations for it,
19 you know, because certainly everything has an economic
20 consideration.

21 Other considerations that we'll be looking at
22 are, you know, how well does it reduce exposure. How
23 durable is it? Will it stand up over time? How much
24 maintenance will it need in order to continue to be
25 effective over time? Those are the types of questions

1 that we'll be asking. And out of these pilot
2 remediation projects, we'll be using those, we'll be
3 doing kind of a 2-phase feasibility study as I see it.
4 The first phase will be a mini feasibility study to
5 evaluate which pilot will be used. Then we'll use the
6 data from the pilots, do a larger feasibility study to
7 see if we can ramp what we've learned from the pilots
8 to the other areas of the river.

9 Then I think Peter's probably got some
10 followup to that.

11 PETER SIMON: Yeah. I think what Al said is
12 absolutely right on. We're very early in the process.
13 The site characterization report was released last
14 week. We've already initiated the pilot corrective
15 action and planning process, but in that process a lot
16 of the decision factors and criteria that we've talked
17 about need to be brought into the evaluation. A
18 decision matrix and decision tree is something that we
19 need to develop to make -- to help us make the right
20 decisions. And, like Al said, I think it really will
21 stem from a feasibility style analysis developing a
22 series of criteria and possible remedies, including
23 costs, including, you know, time of the year, a number
24 of things, and the results of those things will be
25 available. They're not available yet because we're in

1 the process of developing that criteria.

2 AUDIENCE MEMBER: I'm not so interested in
3 the particular dates. I'm trying to understand the
4 process of the general public access and role in that
5 process.

6 Is -- when I read the few documents I was
7 able to on line, I mean they were all there, it's just
8 a matter of time and digesting it, it appears to me
9 you're ready to dredge or dig something up in the next
10 couple months. And I don't know if that's true or
11 not, but let's just say I read that correctly. Where
12 is the decision matrix given to the public for input
13 on that? Maybe I'm getting the cart before the horse
14 here.

15 PETER SIMON: Al? (Inaudible).

16 AL TAYLOR: We will be, you know, going
17 through a decision matrix, kind of looking at some of
18 the things I talked about earlier, and there will be
19 some public input to that. But for areas where
20 contamination is -- where it is actively exposed, for
21 example, at the river bottom like at Reach D we have
22 dioxins and furans at the surface. We also have a
23 number of other contaminants present at, you know,
24 several hundred parts per million levels, contaminants
25 that we're finding in caged fish downstream or we have

1 historically found in caged fish downstream, you know,
2 that's the kind of material that's probably going to
3 need to be removed one way or the other. In other
4 situations where you have, for example, dioxins and
5 furans that are not currently exposed at the river
6 bottom, and they are not likely to become exposed in
7 the near future, then those are -- we'll have
8 different criteria for that and we'll have -- we see
9 that as having more time to look at it and develop
10 different -- different options. And there's going to
11 be a number of different options that are going to
12 have to be applied to this kind of situation This is
13 not a one-solution-fits-all. What's appropriate in
14 one area, like Reach D removal, may not be appropriate
15 somewhere in Reach K. Okay? I think Jim wanted to
16 follow up with something.

17 JIM SYGO: I think one thing that's necessary
18 to clarify is that some of the issues that we're
19 facing right now are not necessarily the ultimate
20 remedial option. The indications that you're seeing
21 as part of the PCAP, particularly in area --

22 MR. TAYLOR: D.

23 JIM SYGO: -- D, and all to some extent is an
24 interim action, it's an interim response action again,
25 because the levels are as high as they are. So as

1 part of that process, the department required Dow to
2 develop this plan to address those areas. Now, the
3 hope is that those particular areas will be addressed
4 in a manner that hopefully may end up utilizing the
5 options that are implemented as the long-term remedy
6 for those areas, too, but we can't be certain of that.
7 So, you know, there's kind of a greater urgency for
8 these areas where we're seeing the significantly
9 higher concentrations, particularly within the river
10 sediment as well as right along the shoreline. So I
11 thought it was good to try to at least distinguish
12 between what we're considering now, an IRA that needs
13 to be addressed very quickly versus what longer term
14 will be a, you know, eventually the remedial program
15 that's proposed for the river and the feasibility
16 study dealing with that, because a lot of the items in
17 your question about the -- how we're going to approach
18 this long term is part of that remedial action which
19 is for the ultimate cleanup and not necessarily for
20 the IRA. The IRA may lend us information that will be
21 applied to that long-term remedial action.

22 AUDIENCE MEMBER: That's a good description
23 of the interim versus the long term. That helps. I
24 just want you to know there's a whole lot of folks
25 that believe you can't improve on zero exposure, and

1 we believe that's what the U of M study told us, so
2 even though you consider it interim, we consider it
3 significant, so. Thank you.

4 CHUCK NELSON: Would you please go to the
5 mike?

6 AUDIENCE MEMBER: Yelissa Pfeiffer, Bay City.
7 I'm resident of approximately mid to lower portion of
8 Saginaw River near ground island level, river walk
9 park wetlands, and I offer myself to be trained as
10 volunteer -- to be trained by Dow Chemical experts and
11 Midland DEQ people how to gather the samples of
12 different portions of the wetlands of the river walk
13 along the Saginaw River mid portion, at the level of
14 middle ground island. I have it front of my house.
15 Would be easy deal once I could be instructed how to
16 do it as volunteer. I can help out and would like to
17 be included. Together with the rest of the people of
18 lower and middle portion of Saginaw River who are
19 somewhat poorer than people in Midland and would just
20 like to be considered to be in your diagnostic
21 explorations and also we want to be part of your
22 remedial plans, especially once they start. We want
23 to be ready for it. We want to be part of it. We
24 want to help. We want to be educated and not to be
25 left behind. I suggest you do the same thing with the

1 Saginaw Bay. Thank you very much.

2 AL TAYLOR: Thank you.

3 CHUCK NELSON: Other questions, comments?

4 Deb, you had something you wanted to say in regards to
5 the earlier question. Why don't you do that right now
6 before Terry starts here.

7 DEB MACKENZIE-TAYLOR: I did want to respond
8 to something that --

9 CHUCK NELSON: We know you're brief.

10 DEB MACKENZIE-TAYLOR: The previous questions
11 with regard to the U of M study. The U of M study did
12 see some increase in exposure with people that have
13 eaten the fish in the Tittabawassee River, Saginaw
14 River, and Saginaw Bay and they did see increased
15 exposure in people that live in the area of the
16 floodplain. Also you have to keep in mind that the
17 analyses that U of M researchers have done to date was
18 looking at the influences over the whole population
19 that they studied. They haven't focused much on the
20 individuals who live in those higher contaminated
21 areas or focused on a lot of the fish consumption and
22 stuff like that. They looked at what the influences
23 were on the whole population, and that's what's been
24 reported to date.

25 CHUCK NELSON: Terrence, go ahead.

1 AUDIENCE MEMBER: That was kind of
2 anticipation of the question. I've got down here,
3 would someone from DEQ please correct Mr. Egerer's
4 observation that Dr. Garabrant's report supports the
5 contention of zero exposure, and you've just done
6 that. Thank you. And I hope we don't hear that
7 again.

8 I have a couple of questions, I'll take them
9 one at a time if that's all right, Chuck? Is it fair,
10 Al, to say that the Human Health Risk Assessment
11 conflict that you alluded to earlier between Dow
12 Chemical Company and the state is over the issue of
13 Dow minimizing or perhaps choosing to eliminate the
14 toxicity of dioxin and human health consequences?

15 AL TAYLOR: No, I don't think that's a --

16 AUDIENCE MEMBER: Fair characteriz~~ation~~?

17 AL TAYLOR: I don't think it's a complete
18 characterization. There are certainly differing
19 viewpoints and, again, I'm a geologist. The
20 toxicologist is going to come up here to answer this
21 question.

22 DEB MACKENZIE-TAYLOR: I'm sorry, I had to
23 let him struggle a few minutes.

24 I think there are some issues that we need to
25 discuss. There are differences of opinion. We're

1 going to discuss them and see if we can come to
2 agreement on these issues. If we do still have
3 difficulty in coming to agreement on some of the
4 technical issues, we will -- we may be taking them to
5 a science advisory panel.

6 AUDIENCE MEMBER: So they over the toxicity
7 of these --

8 DEB MACKENZIE-TAYLOR: Both exposure and
9 toxicity. We have to discuss both exposure and
10 toxicity issues.

11 AUDIENCE MEMBER: Thank you. It's probably I
12 think very fair to say that the approach that's been
13 presented tonight is very, very methodical. What
14 happens, however, in the case of a rain event and what
15 is being done to address the floodplain contaminants
16 which could very possibly and probably will present
17 themselves as runoff and enter into the water column
18 and result in additional inputs to the river and the
19 flashing that's been referred to? What happens to all
20 that methodical work that's gone on prior?

21 PETER SIMON: Are you referring to that site
22 characterization that's currently underway --

23 AUDIENCE: Yes.

24 PETER SIMON: -- and based on the flashy
25 nature of the river what's going to happen six months

1 from now or a year from now --

2 AUDIENCE MEMBER: Yes.

3 PETER SIMON: -- based on the information
4 that we presently have? The floodplain areas, they're
5 heavily vegetated. The wetland areas are depositional
6 settings. These are not erosive areas. The erosive
7 areas are not in the upland and the floodplains. The
8 erosive areas are along the banks where you have the
9 highest shear stresses or the high velocity forces at
10 what we'll refer to as the bank full condition, which
11 is the highest energy time of the river. When the
12 river gets over into the overbank area, the velocities
13 actually drop and the shear stresses in those surface
14 deposits actually is not such that you're going to
15 remobilize those materials, so I think to answer your
16 question, without you, I think necessarily asking it,
17 is the characterization that we've done this year
18 going to be good next year; and the answer to that is
19 yes. These floodplain areas are depositional areas.
20 They're not erosive areas. They're not erosional
21 areas.

22 AUDIENCE MEMBER: But there have been uplands
23 that have been flooded periodically, including several
24 of the parks. Will that -- won't runoffs still occur
25 during rain events?

1 AL TAYLOR: Sure.

2 AUDIENCE MEMBER: Adding to the water?

3 AL TAYLOR: I want to provide a little bit of
4 clarification on that. Peter, I think is absolutely
5 right that these areas are net depositional areas,
6 like over time they accumulate dioxins and furans over
7 most areas. There are some areas that are net erosive
8 areas, or places that lose soil over time through
9 there. Whenever you have a flood event and the water
10 starts coming back off the land into the river, a lot
11 of times you'll see that water is turbid and muddy,
12 it's not clear, and there's probably some transport
13 coming back into the river. There's going to be some
14 down stream transport. As part of the overall
15 corrective action process, you know, that problem is
16 going to have to be addressed. Where they have areas
17 where we have net runoff that is contaminated, those
18 areas are going to have to be addressed as part of the
19 overall corrective action process. One of the things
20 we have to get control of first, though, as Peter
21 showed, we have some of these steep banks where some
22 of our highest levels of contamination are, and in a
23 lot of cases, you know, the natural movement of the
24 river is exposing some of that hot core and that is,
25 you know, actively eroding into the river. Those need

1 to be stabilized first and addressed first I'm not
2 trying to minimize the overall runoff issue, but
3 that's kind of an overall kind of watershed issue that
4 we're going to have to address as part of the remedial
5 action plan for this -- for this site.

6 AUDIENCE MEMBER: One more and then I'll let
7 somebody else come up. Nothing has been said this
8 evening about sediment traps. What engineering
9 efforts are being proposed to prevent dioxin from
10 being carried into Lake Huron?

11 PETER SIMON: We talked about when we looked
12 at the PCAPs for Reach K, L, M, and N, I mean I gave
13 you a couple of examples of some the options that are
14 being considered. One of the options that we haven't
15 talked about is sediment trapping, both in-channel
16 potentially, now there are some substantial
17 complications given the nature of the Tittabawassee
18 River, but as well as overbank or off-channel sediment
19 trapping. There are certain areas of the river, the
20 reason why we have elevated concentrations at the
21 surface is because those are low velocity areas.
22 During flood conditions the water velocities are
23 dropping and the sediments are dropping. Those may be
24 very good areas to put in some off-line or off-channel
25 sediment trapping capabilities. **Alternatives** that are

1 on the table for evaluation, but again, it's not --
2 it's not the right solution for every scenario. It
3 has to be in the right spot in order for it to be
4 successful. It is definitely an option that is in
5 consideration.

6 AL TAYLOR: I guess one other point as part
7 of the NRDA process, there is a couple of sediment
8 trap kind of large scale studies going on right now.
9 Art Ostaszewski is the technical representative for
10 those groups for the -- recently the 6th Street turning
11 basin was dredged. A freighter got stuck there this
12 last year. That area is actively being dredged --
13 that presented a sediment trap opportunity before the
14 freighters start moving around in there again. So
15 after it was dredged, sampling was conducted. And
16 before freighters start moving through there again in
17 the spring additional sampling will be conducted to
18 determine how effective that particular area, which is
19 basically a bank-to-bank, about 800-foot wide sediment
20 trap, we believe, how effective that would be, and
21 that's being funded, by Dow through the NRDA process.

22 There's also an upstream historic turning
23 basin, the Ojibway Island turning basin, which has
24 completely silted in or sedimented in and sampling was
25 conducted in there. Cores were taken, some very long

1 cores actually, to determine, okay, this used to be a
2 turning basin, how effective would this be as a
3 sediment trap, perhaps in the future. So that's part
4 of the evaluation that's kind of actively going on.
5 They're in the process of being analyzed. Art, do you
6 want to provide some more detail?

7 AUDIENCE MEMBER: Have those samples been
8 analyzed yet?

9 ART OSTASZEWSKI: I'm Art Ostaszewski, I
10 work with Dow and the Michigan Department of
11 Environmental Quality and I sit on a technical
12 workgroup committee that is looking at sediment traps
13 both, like Al said, at Ojibway Island which is in the
14 City of Saginaw. It was abandoned about 20 years ago
15 and it has filled in. Sediment cores were taken at
16 that location in November. I was on-site one day
17 watching them take the cores and I went to their
18 processing lab and I watched them section the cores
19 for analysis. The data is not available yet. We're
20 expecting it relatively soon. The technical committee
21 will evaluate the data taken at Ojibway Island on the
22 sediment cores. I think we just had a call on it this
23 morning and we're expecting the results within the
24 next month or so, so the technical work group will get
25 together and review those.

1 At the 6th Street turning basin, where the
2 **navigational dredging occurred recently**, not only were
3 samples taken there, but also an analysis for the rate
4 of deposition, the rate of flow, how fast that's going
5 to fill in during a -- during normal flow periods, and
6 like Al mentioned, we have some additional data to
7 come this spring which is going to reflect peak flow
8 conditions as far as the suspended sediment loads, the
9 type of sediments that are settling in there, grain
10 sizes, and geochemistry, along those lines. There was
11 some additional early work done by the Corps of
12 Engineers that looked at modeling sediment traps in
13 the Saginaw River. That data is available from the
14 Army Corps of Engineer, Detroit district website.
15 Basically they showed that sediment traps are
16 effective to capturing medium and coarse grain sands,
17 primarily clays and final materials just don't settle
18 on, and they get passed through. The core study did
19 evaluate the length, and width, and depth of sediment
20 traps, specifically in the Saginaw River that would
21 make the most sense, so we would have that kind of
22 information available.

23 AUDIENCE MEMBER: Thank you.

24 AUDIENCE MEMBER: Hi. Mike Kelly. I live in
25 Freeland. It's tough to follow Terry Miller. I sat

1 on the same side of the table with Terry earlier this
2 week. We talked to a state legislator about combined
3 sewer overflows (CSO) and had a nice discussion about
4 that, and just an interesting piece of trivia for you
5 folks: Dioxin's an issue, but CSOs and the amount of
6 partially-treated and non-treated sewage that came
7 down the Saginaw River last year, calendar year 2006,
8 was 2.1 billion gallons, so just keep that in mind if
9 somebody ever asks you how many billion gallons came
10 down the river.

11 I'm encouraged, I guess. To hear the folks
12 from Ann Arbor, and Al in particular, talk about the
13 GeoMorph study and Al say that, you know, this is the
14 type of thing that he would do. And I think it makes
15 a lot of sense to discuss, you know, a suite of
16 options in terms of the removal of dioxin, whether it
17 be dredging or some type of in-place solutions. I
18 think as both folks mentioned it's going to be a
19 tricky process, it's going to take some creative
20 solutions. I'm not aware of anyplace in the world, or
21 in the country at least that anything quite this
22 complicated has taken place, so I'm encouraged that
23 there seems to be some agreement on that.

24 After Terry's tough questions, I want to
25 throw one softball question at you and it dawned on me

1 in the back of the room. I talked to Cheryl earlier
2 today and she pointed me I the right direction to get
3 some information from the MSU folks on the ongoing
4 study, I think this is a study from, if I'm not wrong,
5 that goes through 2008 looking at a variety of
6 wildlife in the floodplain area. The most updated
7 information that I could find on that was the end of
8 2006, most of it was put together in 2005, which
9 essentially has identified no ill effects of the
10 dioxin in the floodplain on a number of species; mink,
11 Kingfishers, egrets or herons they've looked at.

12 It dawned on me that given that, that we
13 haven't been able to identify any specific problem of
14 any of the species that they're looking at, and
15 understanding that the study is ongoing, when it comes
16 to doing these dredging-type activities where you're
17 going to go in, and clearly one of the things that
18 happens during dredging, whether it's in the water or
19 if you're going to go up in the floodplain and do
20 this, you're going to destroy some habitat. And we
21 know that there are some healthy species living there.

22 Is there any type of environmental impact
23 analysis that goes along with this process that you
24 would have to do, for example, that if you were going
25 to go in and disturb an area to put in a high-rise

1 office building or anything to that effect? Is there
2 any analysis that goes into that, Al?

3 AL TAYLOR: No, I don't think there's a
4 formal analysis that occurs like that. There's
5 probably some analysis like that that goes in when we
6 go through the wetland permitting processing and
7 things like that. But it's one of the considerations
8 that is quite frankly going to be taken into account
9 when these things are done, because that's part of
10 what we want to know as coming out of the other end of
11 this project, if there's unacceptable wildlife
12 disturbances as a result of some particular action,
13 those are things that we want to find out and avoid in
14 the future. So that's part of it.

15 AUDIENCE MEMBER: Good evening. Mike Krecek,
16 health officer, Midland County Department of Public
17 Health. Just wanted to ask Al about, particularly
18 about this Human Health Risk Assessment that you're
19 talking about. I know -- and whether or not this
20 would be -- have a relationship to the U of M exposure
21 study, I'm kind of wanting to find out some more
22 information about how you're going to conduct the
23 Human Health Risk Assessments. I see Deb's coming to
24 the mike.

25 I would probably first of all mention, Deb,

1 that I think you might have slightly mischaracterized
2 the Garabrant study, a little bit, in that it just
3 being a generic study, because there was a floodplain
4 component, they looked at Midland, they looked at
5 Saginaw, they looked inside and outside of the
6 floodplain, so it's not just a generic study of our
7 community.

8 DEB MACKENZIE-TAYLOR: But the amount of
9 impact for each of the sources was for the whole group
10 that he has reported.

11 AUDIENCE MEMBER: Yeah, but it's been broken
12 down by each of the subsets, too, so I think --

13 DEB MACKENZIE-TAYLOR: He has compared the
14 groups, as well, and that's where they did see some
15 significant differences between the control community,
16 yeah.

17 AUDIENCE MEMBER: I wouldn't characterize it
18 as zero, either. I would agree with that assessment.

19 DEB MACKENZIE-TAYLOR: It wasn't zero, and I
20 think they will do some additional analyses that will
21 give us some more information. We --

22 AUDIENCE MEMBER: There did seem to be some
23 minor contribution.

24 DEB MACKENZIE-TAYLOR: We are looking at the
25 U of M data and seeing what we can use, especially for

1 the exposure assessment aspects. They're -- it's not
2 going to give us all the information we need. It's
3 not going to give us any information on toxicity, so
4 we are looking at what information we can use from the
5 U of M study. There are other pieces of information
6 we can use, like a study Korey has done recently on
7 fish consumption on the Saginaw River, Bay, and
8 Shiawassee River, so there are several sources of
9 information we'll be looking at. We will have to look
10 at other information for the toxicity aspects of it.

11 AUDIENCE MEMBER: Okay. But when you say
12 human health, I mean, I assume at some point we're
13 going to be testing human beings in some capacity?

14 DEB MACKENZIE-TAYLOR: Right now we're
15 talking about doing a risk assessment and assessing
16 risk. I don't think there's any plans at this point
17 to do a health study. To my knowledge there's no
18 plans to do a health study. But, and I'm seeing "no"
19 nods or shaking heads over there, so that's not my
20 understanding that there's going to be a health study.

21 AUDIENCE MEMBER: Just the way this is on
22 here it's rather confusing, I guess.

23 DEB MACKENZIE-TAYLOR: Okay.

24 AL TAYLOR: I guess one thing I'd like to
25 followup with on that I guess is we have requested

1 some more specific analysis of, in particular I think,
2 the Tittabawassee River floodplain to the extent that
3 Dr. Garabrant's group can do this, given the
4 confidentiality burden that that thing carries with
5 it, of looking at, as closely as possible, people who
6 are, you know, living on areas which we believe are
7 going to be highly elevated, not just the 100-year
8 floodplain, but those, you know, like those priority
9 one and priority two property owners and also, you
10 know, people who specifically, you know, behavior-
11 based looking at the data, you know, people who eat
12 the fish, people who eat wild game from the
13 floodplain. So, and I think that's going to be very
14 valuable if we can get that information. And we will
15 use the Garabrant study to the maximum extent possible
16 to help us out with this.

17 CHUCK NELSON: Other questions?

18 AUDIENCE MEMER: Hi, I'm Rita Jack. I live
19 in East Lansing, work in Lansing for the Sierra Club.
20 A couple of related questions. Looking at the broader
21 picture, I saw on the EPA's website that the Saginaw
22 Bay is listed as we, most of us know, on the impaired
23 waters list for dioxins and PCBs. The TMDL year, that
24 is the total maximum daily load year is 2010, so I'm
25 putting that together with what you were saying

1 earlier about the goal for 2010 and what -- I'd like
2 to know what is the -- what's the vision for 2010.
3 What do you see there? And does that include cleanup
4 of Saginaw Bay, in addition? What's the grand plan
5 for all of this to be taken care of?

6 JOHN MUSSER: Thanks. To start, go back to
7 the framework agreement which was resolved in 2005
8 between the State and Dow which envisioned a
9 comprehensive solution or resolution of all claims,
10 including the four distinct areas included in our
11 license which is the area of Midland, the
12 Tittabawassee River, the Upper Saginaw, and the Bay.
13 I think our vision here for 2010 is to have a plan in
14 place for how each of these areas are going to be
15 resolved. Let me just separate out Midland and the
16 Tittabawassee River and the Upper Saginaw as a group
17 and say that, you know, the remediation may not be
18 complete by 2010 but we will be well into the solution
19 phase or the remedy phase at that point is the vision,
20 as I understand, and I'll leave room here for some of
21 our other closer-involved people to correct me if I
22 get off the track here, but that's sort of the
23 grouping of those three areas.

24 The Saginaw Bay and the rest of the Saginaw
25 River have been envisioned as -- the claims there

1 would be resolved in terms of some kind of a endowment
2 or trust fund that might come from natural resource
3 damage claims that could be applied in a number of
4 different ways to benefit, not only the eco system,
5 but the economic vitality of the area. Now, those
6 decisions, that trust fund, that's just a vision at
7 this point, but it was looked at more as an
8 opportunity to apply that sort of an approach than to,
9 for example, I mean it's not practical to think about
10 removing the sediments from the Saginaw Bay, per se.
11 So that's kind of the short story there. Does anybody
12 from the Dow team want to add any comment to that.

13 CHUCK NELSON: Do you guys have any comment
14 on this?

15 AUDIENCE MEMBER: As independent person, can
16 I add something?

17 CHUCK NELSON: Hang on just a second. Let's
18 make sure that these folks. Is there any addition?
19 Do you guys have any comment on this?

20 AL TAYLOR: I'm just -- I think it's
21 important to note that while we agree that that's kind
22 of, I think, what the framework types envision, we
23 also need to, as part of this process, make sure that
24 we develop sufficient information that, you know,
25 human health and the environment in the Saginaw River

1 and Saginaw Bay are protected by whatever solution we
2 come up, because we have to, you know, an endowment's
3 great, but we still have, you know, under corrective
4 action, to meet that goal, too, so we're going to --
5 it's going to be kind of a balancing act to do that.

6 JOHN MUSSER: And that is specified, per se,
7 in the framework agreement, that very language, I do
8 believe.

9 CHUCK NELSON: So, questioner, did that get
10 to your question? Yes? No? Come to the mike if it
11 didn't because then we'll let other people come up.
12 One thing at a time here.

13 AUDIENCE MEMBER: Al, thank you for adding to
14 that. No, I'll just keep coming to the meetings and
15 see how it all unfolds?

16 CHUCK NELSON: Okay. Go ahead, ma'am.

17 AUDIENCE MEMBER: I think that we all have to
18 pull together in this issue. It is not only Dow
19 Chemical producing plant in the presence, or we had
20 many plants along Saginaw River producing in the past.
21 They all have left Bay City in the meanwhile, but the
22 pollution they left behind is terrific, and Dow
23 Chemical is not the only one who shall provide for
24 diagnosing in form of sample collecting in the
25 environment and in the human beings. I think the

1 public health and other companies and we private
2 people should be feeling responsible of conducting and
3 participating in those studies because we all are
4 involved in it. We all are paying the consequences of
5 not just dioxin levels in our blood, we are also
6 having heavy metals in our blood and at least the
7 blood samples in 24-hours urine could be easily
8 collected in the local health centers, especially
9 those big ones like Mid-Michigan and Bay Med and that
10 should be coordinated -- should be a collective
11 effort, not just push everything at Dow Chemical and
12 DEQ.

13 CHUCK NELSON: Somebody had a hand up back
14 there? Please come to the mike.

15 AUDIENCE MEMBER: Hello. My name is Brett
16 Cherry, I'm from Freeland. First question I have is:
17 For some time, I mean really not very long ago, Dow's
18 official position on dioxin contamination, especially
19 in these areas, is that it posed no significant health
20 risk. I'm wondering today, after recent studies have
21 been done, is that still Dow's official position?

22 JOHN MUSSER: I would say it certainly is our
23 position, and I would say that position has been
24 bolstered by what we have from the University of
25 Michigan's exposure study which basically showed that

1 people's blood, contamination level with dioxins and
2 furans is within the national average, and that would
3 suggest to me that people are at no greater threat
4 here than anyplace else in Michigan or in the country
5 for that matter.

6 AUDIENCE MEMBER: Well, I understand that
7 that particular study, I think, is good for that
8 group, that population of people that are there;
9 however what other studies are being done? We have
10 talked about some form of health assessment, but
11 really one of the primary reasons why people are so
12 concerned about this contamination is the health of
13 communities. Now, if you do not have that data, no
14 one is going to move forward on this issue from what
15 -- based on my assessment. My question is: What
16 other affirmative assessments are going to be done on
17 the health of local communities?

18 JOHN MUSSER: I think that that's -- I don't
19 know that there are other assessments other than what
20 we've talked about this evening about the Human Health
21 Risk Assessment that's going to be conducted which is
22 a pretty rigorous exercise. Maybe I can get some help
23 from some of my consultants here.

24 TOM LONG: I'm Tom Long from the Sapphire
25 Group and one of Dow's consultants, and a toxicologist

1 by training and choice. I don't suspect that there
2 would be a health assessment or a health study, I
3 should say, in this community for one relatively
4 simple reason, the number of people potentially
5 exposed is so small that it would be hard to see an
6 effect statistically.

7 Now, that having been said, there are studies
8 that have gone on around the world, including places
9 like Seveso, Italy, and Nitro, West Virginia with the
10 workers and Germany and other places, for both dioxins
11 and dioxin-like chemicals that are available and can
12 be used to answer those kind of questions. Largely
13 they have shown little health effects aside from
14 chloracne.

15 Now, having said that, the purpose of what we
16 are doing, Deb, and some of the other people here, the
17 Risk Assessment is a regulatory device designed to
18 help us make decisions in the face of uncertainty and
19 that includes uncertainty over whether or not there
20 are human health effects of dioxin. We're assuming
21 that there and making decisions on that basis.

22 AUDIENCE MEMBER: Have there been any
23 historical case studies done or -- let me rephrase
24 that question.

25 Have you referred to any historical case

1 studies done such as epidemiological surveys that have
2 been done within this area, the cancer rates? There's
3 a lot of information here. I mean when the World
4 Health Organization and other organizations come
5 together they do a number of different studies --

6 TOM LONG: Yes.

7 AUDIENCE MEMBER: -- to find out if the
8 toxicity is there, what it does to people. Indeed
9 these studies take long periods of time; however, what
10 I am saying that is is that that is really one of
11 people's primary concerns, and if that is not Dow's
12 primary concern, there is a big problem, there is a
13 huge conflict of values.

14 Now, let me ask this question: Is the DEQ's
15 position the same on this. Do they also agree that
16 the levels of toxicity in those rivers poses no
17 significant risk to the health of individual citizens
18 within the Tri-Cities?

19 CHUCK NELSON: Let her answer this. Dueling
20 toxicologists.

21 DEB MACKENZIE-TAYLOR: We aren't in the same
22 opinion that there is no health effects. We don't
23 know if there are health effects or not at this point
24 in time. We need to assess the risk and we need to
25 make sure that we are being protective of the public

1 health in the area.

2 TOM LONG: I would just add that dioxin is
3 the most studied chemical on the face of the earth,
4 and there is literally, what, 30 or 40 years of both
5 human and animal studies. To be honest with you we've
6 invested billions in studying this compound, including
7 things like the Agent Orange exposure in the Vietnam
8 Veterans and the industrial and nonoccupational
9 exposures in cities and towns around the world, and
10 it's really hard to find anything other than chloracne
11 in highly exposed workers.

12 AUDIENCE MEMBER: Are you taking into account
13 that the ATSDR considers forms of dioxin as a
14 carcinogenic, correct?

15 TOM LONG: Based on animal studies.

16 AUDIENCE MEMBER: Based on animal studies.

17 DEB MACKEINZE-TAYLOR: And some human data.

18 TOM LONG: And I will say, yes, I mean there
19 is --

20 AUDIENCE MEMBER: I don't mean to take up too
21 much time, it's just that this is a very huge issue
22 and the problem is is that there have -- I do not see
23 much independent evaluation being done. Where is the
24 EPA on this, if they have any standing at all. That
25 is the problem that we're dealing with right now is

1 that we're dealing with the problem of bureaucracy. I
2 mean it's very clear. Anyone who's worked for a large
3 corporation knows this, I mean, it's not -- it's quite
4 obvious.

5 My next question is --

6 CHUCK NELSON: Hang on a second. You're
7 asking about the EPA. They're here. You guy's want
8 to say anything?

9 GREG RUTLOFF (EPA Spokesperson): From the
10 EPA's standpoint we have been working on a dioxin
11 reassessment for a number of years. Most recently
12 last year the National Academy of Sciences did a
13 review of EPA's dioxin reassessment, and a few months
14 ago comments from that review were provided back to
15 the agency. Right now our headquarters is evaluating
16 those comments and deciding how to respond to them.
17 And that's as much information as I have right now at
18 that point since that's something handled by
19 toxicologists.

20 AUDIENCE MEMBER: I understand. So at this
21 point it is still controversial as to whether high
22 levels of dioxin contamination in those rivers lead to
23 cancer and other forms of disease?

24 GREG RUTLOFF: Well, that dioxin reassessment
25 is in general. It's not targeted at this particular

1 situation. It's establishing the toxicity just on its
2 own.

3 AUDIENCE MEMBER: Because this is a very
4 unique situation, correct? I mean are the levels
5 high? I mean is this very common throughout the
6 country according to the EPA?

7 GREG RUTLOFF: It's relatively uncommon, but
8 there are other areas of dioxin contamination that
9 have existed.

10 CHUCK NELSON: Hang on just a second.

11 GREG RUTLOFF: If it would help, I'd be happy
12 to talk to you --

13 CHUCK NELSON: I want to make sure that folks
14 who haven't had an opportunity yet -- we'll let
15 somebody else have an opportunity. You can come back.

16 Is there anyone that has not asked a question
17 yet?

18 AUDIENCE MEMBER: You let the man behind talk
19 longer (inaudible).

20 CHUCK NELSON: I didn't call on him yet
21 either. So is there someone who hasn't asked a
22 question yet, because I want to give that individual
23 an opportunity.

24 JOHN MUSSER: Hey, Chuck, could I add
25 something? Excuse me. Chuck, could I add something

1 to the last inquiry? I think you alluded to, or even
2 mentioned, you know, is there anything local in terms
3 of epidemiology studies that might be applied or
4 applicable to this circumstance. And the answer to
5 that is yes, and it has to do with Dow's worker
6 population. These are people that actually worked in
7 the plants that had arguably exposures many times the
8 level of anything that we've seen thus far in the
9 floodplain or any indication of people being exposed
10 to levels anywhere near that. And we've been studying
11 these people for 40 or 50 years and we have not
12 identified any health effect other than the chloracne,
13 that Tom mentioned, which is a skin condition, like,
14 severe ache. But we did not find any cancer of any
15 type or any other illness that was evaluated, and it
16 was a broad spectrum of tests that were done and
17 different diseases that were evaluated. So I think
18 that's also another reason that we look at when we
19 take the position that we do with respect to the
20 potential health effects associated with the
21 contamination in the floodplain or in the sediments.

22 CHUCK NELSON: Ma'am, go ahead.

23 AUDIENCE MEMBER: Hi. My name is Margaret
24 Walther, and I really didn't intend talk tonight, I
25 just wanted to come and hear all of this because I've

1 never been to one. But, my son has cancer and he's
2 11, and I've been at U of M and there are six Ewing's,
3 which is a rare cancer in kids, six from Midland in
4 the last five years; two from Bay City, and one in Mt.
5 Pleasant. Why study the animals? Study the humans.
6 Because to me that's a lot. That's a lot of cancer in
7 children. That's all I have to say.

8 CHUCK NELSON: Are there other people who
9 have not asked a question yet? Go ahead, sir.

10 AUDIENCE MEMBER: Yes. My name is Dave
11 Holtz and I'm Michigan Director for Clean Water
12 Action, and one of our big concerns, of course, is the
13 Great Lakes, and I have two questions regarding that
14 based on the information here.

15 One is, as I understand it, in June of 2007
16 is when an assessment is going to be undertaken of
17 Saginaw Bay. First, is that correct? And if it is,
18 when will it be completed? What's the other bookend
19 on that?

20 AL TAYLOR: It is correct that the corrective
21 action process for the lower -- actually the Saginaw
22 River and the Saginaw Bay would begin in June of this
23 year. The license is structured such that during the
24 first four years of the license, the Tittabawassee
25 River and the City of Midland would be addressed, and

1 during that time the Department of Environmental
2 Quality and US EPA took on the obligation of
3 collecting additional environmental data from the
4 Saginaw River and Saginaw Bay to better understand the
5 issue down in that -- down in that region. And we
6 have done that. We've gotten a couple of grants.
7 We've done some baseline sampling of the Saginaw River
8 and Saginaw Bay, and we have a report out on it.

9 In June of this year, unless another -- an
10 alternate agreement is entered into, Dow is required
11 to submit something called a scope of work for
12 remedial investigation activities for the Saginaw
13 River and the Saginaw Bay. Now that, you know, that
14 is something that is obviously coming up quite rapidly
15 and so I think probably in May we may hear more about
16 that during our May quarterly meeting.

17 AUDIENCE MEMBER: And my next question:
18 Given the Army Corps' opinion about the use of
19 sediment traps in the Saginaw Bay, is that being
20 looked at by the DEQ as an interim response?

21 AL TAYLOR: Sediment traps are being looked
22 at seriously on the Saginaw River, because although
23 dioxins and furans typically, like PCBs, tend to
24 associate in the environment with finer particulates
25 and organic carbon, we have seen a number of samples

1 in the Tittabawassee River and in the Saginaw River,
2 and in fact, real close to the 6th Street turning basin
3 area, where we have had some of our highest sediment
4 concentrations in a very -- in very sandy material,
5 fine to medium grain sand which is not what one would
6 expect. And so one of the things that we want to
7 evaluate and what we're moving forward with evaluating
8 is, okay, in these particular conditions would
9 sediment traps be a viable way to reduce the mass of
10 contamination that's moving out to the Saginaw River
11 and Saginaw Bay. Sediment traps aren't going to catch
12 the fines. They'd have to be too big and too wide,
13 you know, the water is going to be moving too fast.
14 But, if we can start reducing mass by using, you know,
15 if we can get the low-hanging fruit, we're going to
16 try to get it, and that's why those sediment traps are
17 being evaluated.

18 AUDIENCE MEMBER: Thank you.

19 CHUCK NELSON: Other folks who have not asked
20 a question? Come forward, sir.

21 AUDIENCE MEMBER: This question is for the
22 gentleman from Dow. You made reference to an
23 epidemiological study of Dow employees regarding
24 cancer rates and other diseases. All right. When was
25 that study conducted?

1 MIKE CARSON: I'm Mike Carson. I'm a
2 physician with Dow. We've had oh, about 2200
3 employees that we've been looking at that worked in
4 the plants where there was some dioxin exposure that
5 they could have had since 1940 all the way up through
6 the times when those closed. We've done a number of
7 studies on those folks over the years, and last study,
8 I believe, was published two years ago. We have --
9 the main study, we've done a couple more studies
10 measuring serum levels of those workers, and we have
11 two more studies under way right now. We've published
12 those results and we have a few more that are going to
13 be coming out real soon.

14 AUDIENCE MEMBER: And those studies are
15 designed in-house by Dow? The parameters, et cetera?

16 MIKE CARSON: Yes, they are. They're done by
17 our own epidemiology team and we also have an external
18 science advisory board that gives us advice and review
19 and then they're published in peer review journals.

20 AUDIENCE MEMBER: Are they available to the
21 public?

22 MIKE CARSON: Yes, they are.

23 AUDIENCE MEMBER: And how do you get a copy?

24 MIKE CARSON: Absolutely. Well, we have a
25 listing on our website, I believe, yeah, and if you'll

1 see me afterwards, I'll get you copies.

2 AUDIENCE MEMBER: And for the toxicologist
3 from the state. You said that there were no known
4 health effects in the affected area, right?

5 DEB MACKENZIE-TAYLOR: At this point of time
6 we're not aware of any.

7 AUDIENCE MEMBER: But have you conducted any
8 studies of your own?

9 DEB MACKENZIE-TAYLOR: No we have not done
10 any studies of our own.

11 AUDIENCE MEMBER: So you can't really know if
12 you haven't studied it?

13 DEB MACKENZIE-TAYLOR: That is correct.

14 AUDIENCE MEMBER: But when you hear something
15 like this woman pointed out where there's what, seven
16 cases or something?

17 FEMALE AUDIENCE MEMBER: Six in Midland, one
18 in Mt. Pleasant, and two in Bay City that we know of.

19 AUDIENCE MEMBER: That's nine cases of
20 children under the age of 10 --

21 FEMALE AUDIENCE MEMBER: Rare cancer.

22 AUDIENCE MEMBER: -- with a rare form of
23 cancer. Does that stimulate any interest in doing a
24 study in an affected area like that?

25 DEB MACKENZIE-TAYLOR: We would have to look

1 to our Department of Community Health to look into
2 something like that. We don't have the expertise in
3 our agency to look at that kind of --

4 AUDIENCE MEMBER: Right. But I mean as a
5 representative of the state -- I'm just wondering what
6 --

7 DEB MACKENZIE-TAYLOR: Yes.

8 AUDIENCE MEMBER: -- the process is, what it
9 takes to get a study done.

10 DEB MACKENZIE-TAYLOR: And that is something
11 that -- that -- I mean this is the first I've heard of
12 it.

13 AUDIENCE MEMBER: This is simply anecdotal
14 evidence.

15 DEB MACKENZIE-TAYLOR: Korey's coming up to
16 talk to this. I don't know if they've looked into
17 something like this before or not.

18 KOREY GROETSCH: I guess I'd have to go back
19 and find out if we've had our epidemiologists look
20 specifically in the Midland, Saginaw, and Bay City
21 areas. What exists is the cancer registry and --
22 there exists the cancer registry nationwide that as a
23 epidemiologists can take and assess if they find
24 higher rates of cancer in an area.

25 The difficulty, or the thing to keep in mind

1 with that is that the resolution, the ability for --
2 for science to come in and pick out if four or five or
3 six cancers is higher than normal is difficult. As
4 Tom sort of alluded to, which is you need -- I think
5 you have to step back -- let me step back away from
6 the specific cancer question, but step back to the
7 concept of exposure. For the chemical, and this gets
8 -- I don't mean to oversimplify it, but for the
9 chemical to harm someone it has to get into your body
10 obviously. Okay? For that to get into your body
11 basically you have to engage in some sort of behavior
12 such as consuming the fish primarily in this area,
13 potentially certain species of wild game, certain
14 species of fish, and -- and -- or live on potentially
15 a highly contaminated soil, one of the questions here,
16 okay, now it gets into your body. Now you'd have to
17 be able to get enough of those individuals into a
18 scientific study and evaluate them. And that would be
19 -- so anyway, the point is science is a rough tool to
20 try to pick those things out, so the lack of a finding
21 doesn't mean there isn't a concern.

22 AUDIENCE MEMBER: That's exactly my point
23 which is, why not do a study, when you get anecdotal
24 evidence like this. I mean I'm very familiar with the
25 Lake Charles area, where there's a concentration of

1 about 52 chemical operating plants down there, and
2 there's been 14 cases of anencephaly that I know of
3 anecdotally in the space of 18 months. Anencephaly is
4 a birth defect where the skull is not fully formed,
5 and neither is the brain. And it can be due to a lack
6 of niacin in the mother's body or it can be due to
7 exposure to chemicals. All right? And I tell you,
8 I'll give you an example of what Louisiana did, when
9 women in this Parish County decided to organize around
10 this because they were giving birth to these deformed
11 babies they went to the state and they insisted that
12 the state start doing a study, start keeping data on
13 these types of birth defects, and the state did
14 exactly that, but excluded the county in which they
15 were occurring. Okay? So it's a lot of talk and lot
16 of avoidance and I'm just amazed, frankly, that
17 there's not more interest in actually trying to find
18 out what's going on, I mean I'm sitting here and I'm
19 listening to one woman get up and talk about nine
20 cases of cancer in kids under 10 years old. I'm not a
21 physician or a scientist, but I sit back and I go
22 whoa, something must be going on. What is it? I'm
23 just amazed that there's such ap -- sort of apathy
24 about the whole thing. Because you answered the
25 question saying science isn't a tool.

1 KOREY GROETSCH: No, I didn't say that.

2 AUDIENCE MEMBER: Yes, you did.

3 KOREY GROETSCH: What I said was that it's
4 maybe not going to be a satisfying tool for what
5 you're trying to look for.

6 AUDIENCE MEMBER: That's not what you said,
7 but --

8 KOREY GROETSCH: Well, okay. If I misspoke,
9 I'm sorry, but the point is it may not be the
10 satisfying tool that you're looking for to identify
11 it. Now, --

12 AUDIENCE MEMBER: Can you suggest a more
13 satisfying tool?

14 KOREY GROETSCH: No, I think that's the tool
15 you have to look at. Yes.

16 AUDIENCE MEMBER: End of argument on whether
17 the tool is satisfying or not, it's the only tool.

18 KOREY GROETSCH: Correct, but I guess to go
19 back to the point is finding no difference, finding no
20 effect does not mean that there's no harm, and so
21 that's why you put in place protective measures, and
22 that's why the health department has out there three
23 types of advisories -- four types of advisories. It's
24 to tell people, look, stay away from certain behaviors
25 to limit your exposure. By limiting your exposure

1 you're limiting your risk.

2 AUDIENCE MEMBER: That's not germane to my
3 question. My question is: Why haven't you conducted
4 a health **study**--

5 KOREY GROETSCH: I'm not sure we haven't. I
6 guess the point is there's -- I'll have to go back to
7 find out from epidemiologists if they have looked
8 specifically at cancer-cluster questions in either the
9 Midland, Saginaw, or --

10 AUDIENCE MEMBER: Or any other kind of health
11 effects. It may not be cancer.

12 KOREY GROETSCH: See, now that's the problem.
13 See, now for other health effects you don't have
14 registries, you don't have readily available data to
15 look at, so at that point you're talking about a
16 health study. Right. So -- who's going -- how do you
17 get to a health study is a question I simply -- I
18 can't personally answer, nor do I see -- well, I guess
19 that's a process that has to be asked between Dow
20 probably, between the DEQ and --

21 AUDIENCE MEMBER: Why does Dow have to be
22 part of that health study?

23 AUDIENCE MEMBER: Somebody's got to pay for
24 it.

25 KOREY GOETSCH: Largely. That's probably a

1 good --

2 AUDIENCE MEMBER: The state can't afford to
3 do a health study on its citizens in a highly impacted
4 area?

5 KOREY GOETSCH: That's a good -- we haven't
6 to this point, so where's the funding?

7 AUDIENCE MEMBER: All right. Thank you.

8 CHUCK NELSON: Other questions from folks who
9 have not spoken yet.

10 AUDIENCE MEMBER: Dave Burton, 9865 Midland
11 Road. I disagree with the lady that we shouldn't be
12 studying the wildlife. There's nobody there to
13 protect the wildlife. They're helpless. They can't
14 reduce their exposure, you know, they have to eat and
15 they have to be exposed to the ground. Is there
16 anything being done that could reduce their exposure
17 to the dioxins; supplemental feeding, food plots,
18 supplemental feeding in troughs to keep them from
19 getting their nose in the dirt? And additionally, I
20 myself, I harvested a deer this year solely to have it
21 tested to see how many dioxins were in it to know if
22 it was safe to eat, there's no place to test it. I
23 have no place to test the deer. So how can they put
24 out these advisories without even testing them?

25 AL TAYLOR: Well, with respect to the wild

1 game advisory and with respect to deer, that's based
2 on a study that was conducted in 2004 and where deer
3 were harvested on the Tittabawassee River floodplain,
4 down close to Imerman Park on a farm area down there,
5 and also up near Smith's Crossing were the two areas
6 that were tested and those were compared to a
7 reference area or a background area that was upstream
8 of the Tittabawassee River. And basically what that
9 showed was the deer upstream were essentially clean,
10 didn't have dioxins and furans in them; downstream,
11 and typically what they had in them were furans, but
12 downstream of these two plots we had elevated
13 concentrations at Smith's Crossings. We had even more
14 elevated concentrations at the plot next to Imerman
15 Park. And this was, you know, I think a fair number
16 of animals were collected, we had statistical
17 significance, so there was enough data there to
18 identify, for deer anyway, not to eat the liver. I
19 think deer muscle meat was -- is considered all right.
20 Korey Groetsch from Community Health, I don't think he
21 got a chance to identify himself before, is from
22 Community Health. But we also looked at turkeys and
23 squirrels as part of that study. Additional work on
24 wild game, especially those hunted, is going to occur
25 as part of this Human Health Risk Assessment Process.

1 But, just getting back to your question in
2 general, any remediation that we get to is going to
3 have to take into account, you know, protection of
4 wildlife to the extent that's practical. And a lot of
5 that comes from, you know, presenting contaminated
6 sediments from getting in the river. There may be
7 some areas where, you know, contaminated soils have to
8 be covered or removed, but that is part of the overall
9 process that we have to go through on this.

10 AUDIENCE MEMBER: There is going to be more
11 testing done on wildlife?

12 AL TAYLOR: Yes.

13 AUDIENCE MEMBER: When do we expect to see
14 that?

15 DEB MACKENZIE-TAYLOR: Hopefully the testing
16 will be done this year. We are going to meet with Dow
17 in the next week to start discussing what additional
18 data needs to be collected.

19 AUDIENCE MEMBER: Would hunters be able to
20 take their deer into have them tested before they ate
21 the deer to know if it's safe to eat?

22 DEB MACKENZIE-TAYLOR: That I don't know. I
23 don't know if that's something we can or could do, but
24 I think we can get additional information to know
25 where the deer are and what kind of levels and what

1 other game we need to worry about.

2 AUDIENCE MEMBER: The study was 3 years ago,
3 I mean, they could be safe to eat now, or it could be
4 worse.

5 DEB MACKENZIE-TAYLOR: The deer liver was
6 very high. The deer meat was, I believe, the
7 consumption advisory was to limit consumption for
8 women and children once --

9 AUDIENCE MEMBER: Once a week for women of
10 childbearing age.

11 DEB MACKENZIE-TAYLOR: Yeah. Yeah. So I
12 think if you follow the advisories you'd be doing
13 yourself a service.

14 AL TAYLOR: We don't have any reason to
15 believe at this point that the conditions have
16 changed, whereby the deer have gotten better or the
17 turkey have gotten better. The same conditions that
18 existed then currently exist.

19 AUDIENCE: Would supplemental feeding, food
20 plot, or food out of a trough, would that reduce the
21 dioxins in the animals?

22 AL TAYLOR: I don't know that we could say
23 that, because we're really not sure yet on how they
24 get all of the furans and Denise Kay from Intrex was a
25 member of the team that designed and conducted the

1 study, so.

2 DENISE KAY (Away from microphone): My name
3 is Denise Kay. I work on the Ecological Risk
4 Assessment, and I'm working on the Michigan State
5 University who's conducting a lot of the sampling and
6 analysis of the health of wildlife populations,
7 including lower trophic levels, like small mammals,
8 and then higher tropic levels like the great horned
9 owls. It's the higher trophic levels where you
10 expect to see the greatest accumulation, because this
11 type of compound accumulates up the food chain.

12 And, no, would be the answer to your question
13 about food feeding supplements as an option to help
14 wildlife. Usually that's not considered because
15 there's such a grand of a scale and also the ability
16 to control wildlife behavior isn't, I think, a
17 practical approach.

18 But the good news is, that of all the studies
19 MSU has done to date, although there are higher
20 concentrations in these wildlife samples they've taken
21 from relative to background, they have not seen
22 effects in terms of breeding success, presence of
23 expected populations. They haven't seen any effects
24 on individuals such as deformities in birds that you
25 would expect if this type of compound was present at

1 high enough concentrations to be causing these animals
2 harm. So that's the good news is that there may not
3 be significant harm and certainly at this point there
4 is not evidence of significant harm that would induce
5 you to even consider supplemental feeding.

6 AUDIENCE MEMBER: So the advisory is more of
7 a safeguard to the state?

8 DENISE KAY: The advisory is something
9 different. The part that I work on, Ecological Risk
10 Assessment, is the health of animals themselves. The
11 consumption of wild game is a human health issue, so
12 the amount of dioxin that's found in the deer muscle
13 tissue is not shown to be harmful to the deer and I
14 don't think anyone suspects that it's harmful to the
15 deer themselves. The wild game advisory is present
16 because there is some concern about the potential harm
17 to humans. So it's a slightly different issue.

18 AUDIENCE MEMBER: Okay. Thank you.

19 CHUCK NELSON: Everybody else who wants to
20 say something needs to line up so we can kind of get
21 this done. Okay?

22 AUDIENCE MEMBER: This question is for Dr.
23 Carson. Dr. Carson, where did you go? I lost you.
24 Oh, there you are, I'm sorry. Dr. Carson, did Dow not
25 on one of your healthy workers studies have to amend

1 the study because it showed a higher concentration --
2 no, a higher rate of prostate and stomach cancers in
3 your workers?

4 MIKE CARSON: Thanks for the question,
5 Michelle. It's a -- you know, these studies are
6 complicated and I think John represented it fairly in
7 that overall the workers in the Dow study did not have
8 any increase in health effects. In fact some of our
9 subsequent studies showed that they actually did have
10 very high levels of exposure, much higher than we're
11 seeing in the local community.

12 Now, anytime that you do a study, we looked
13 at, oh, over 25 different kinds of cancers. We looked
14 at the ones that were most associated or cancers of
15 concern from other studies and dioxins and we did not
16 see increases there that were significant, but you
17 always see some cancer rates that are a little higher
18 than average, and some that are a little lower than
19 average. Prostate cancer --

20 AUDIENCE MEMBER: But, Dr. Carson, my
21 question --

22 MIKE CARSON: -- levels were a little bit
23 higher than average. There were others that were
24 lower. Overall there was no increase in cancer rates
25 in the Dow workers.

1 AUDIENCE MEMBER: But did you not amend --
2 send an amended report to the EPA sometime in the
3 1990s, and I don't know what the date was, that said
4 that the study was in error, that your employees had
5 higher incidents of stomach and prostate cancer.

6 MIKE CARSON: Okay, you're -- I'm sorry.
7 You're referring not to our published study report,
8 you're referring to the original letter of explanation
9 -- every time that we do a study we send the reports
10 in to the government because those are reportable
11 findings, and after a subsequent analysis on the first
12 we did report the increase of prostate cancer.

13 AUDIENCE MEMBER: And stomach cancer, also.

14 MIKE CARSON: That's also in our published
15 study. As I said, overall, the rates were on average.

16 AUDIENCE MEMBER: Thank you very much, Dr.
17 Carson.

18 AL TAYLOR: Other questions? We have 9
19 minutes. Fire away, sir.

20 AUDIENCE MEMBER: Hi. Robert Kelley, I live
21 in Midland. The gray-haired gentleman with the
22 glasses on his forehead, you made a comment, you made
23 a comment about Seveso. What is your opinion of
24 Seveso?

25 TOM LONG: Just -- just that --

1 AUDIENCE MEMBER: Because I think you made
2 the comment that they didn't see any real big health
3 effects?

4 TOM LONG: Aside from chloracne, that's true,
5 and if you want to count in the effect on the local
6 wildlife, they were impacted. But as far as the human
7 health, I'm unaware of now after 34 years of any
8 significant human effect in that population which was
9 a fairly large exposure.

10 AUDIENCE MEMBER: Well, I think that's
11 probably an understatement. It was a massive
12 exposure, and I've done some research on some of the,
13 you know, and I'm just a layman, I'm not a high-priced
14 consultant or anything. So I was just going by what I
15 was reading in some of the research and they were
16 saying there were shifts in percentage of males versus
17 female births, that they were seeing concentrations of
18 breast cancer, they were seeing diabetes running
19 widespread, they were seeing incidences of strange
20 types of cancers, so I just found it kind of
21 interesting that you would completely blow off the
22 Seveso thing as --

23 TOM LONG: I'm not. I think the Seveso study
24 is a very important study and, again it's been going
25 on for 30-odd years. As to any specific end point, I

1 think what Dr. Carson alluded to, when you do these
2 multiple comparisons of diseases, certain diseases
3 just show up by chance because of the statistic. What
4 we're looking at is a 95% confidence interval which
5 means out of a -- if you did 100 comparisons, you'd
6 find 5 elevated or perhaps, you know, decrease in
7 (inaudible) by chance, so I think you have -- one of
8 the things that we're looking at just in addition to
9 just the end points that are reported is, you know,
10 how those occur in terms of what I'll have to refer as
11 to the Hill criteria, which are means that you compare
12 the results to to see whether or not they're relevant,
13 one of which I'll just give you is, you know, does the
14 affect occur after the exposure, you know. That
15 sounds like a pretty simplistic issue, but you'd be
16 surprised how often some of these effects that we
17 observe don't follow that rule. You have to have the
18 exposure before you have the effect. There's about 9
19 or 10 other criteria that it has to match and, you
20 know, again I'd be happy to -- you'd have to show me
21 which studies you've referred to in terms of things
22 like diabetes and rare cancers, because I'd be
23 interested if someone has published on that that
24 there's some increase.

25 AUDIENCE MEMBER: All I did was go through

1 Yahoo and do a search on Seveso and started wading
2 through some of the abstracts for some of the research
3 and I was coming up with some pretty startling
4 conclusions that people were making about the effects
5 of the dioxin concentrations and that there are also
6 studies going on in Seveso that actually say that the
7 dioxin contamination -- the effects of the dioxin
8 contamination are continuing in the population in the
9 area, and that there are areas in Seveso where people
10 just don't go because the contamination is still so
11 high. So I was just kind of, I don't know, from you
12 know, once again me being a layman and not being a
13 Ph.D. or anything, I just found it kind of interesting
14 that you were saying that Seveso was, you know, almost
15 like, you know, well, you know, not such a big deal.

16 TOM LONG: Well, I'm sure the people in
17 Seveso wish it hadn't happened, but having happened,
18 it's perhaps the most valuable exposure that we have,
19 simply because it's one of the few that involves non-
20 adults, or at the time non-adults; pregnant women,
21 things like that which, you know, we wouldn't
22 purposely expose such people in normal circumstances,
23 but having happened, this cohort has been followed now
24 literally for -- since it happened, and Bob or Mike or
25 anybody else who's reviewed the data, have you come

1 across these, or Deb? Because I -- I -- I really have
2 not seen any study -- credible study anyway -- that
3 supports the conclusions and I'd be interesting to
4 know where you've found.

5 BOB BUDINSKY: I'm Bob Budinsky. I'm a
6 toxicologist at Dow Chemical. Seveso is a very
7 fascinating story, a very unfortunate story. It
8 happened back in 1976 when a trichlorophenol reactor
9 exploded -- well, basically a pressure valve released
10 and a great deal of 2,3,7,8 tetrachlorodibenzo-dioxin,
11 which is different from the furan, there may be some
12 similarities, was released into the community. These
13 people had very high level exposures, you know,
14 thousands, tens of thousands higher than what our
15 blood levels showed in the University of Michigan
16 study. I think what's significant is the kids that
17 were exposed. They had, you know, young children, 2,
18 3, 4, 5 years old. These kids had levels of 56,000
19 ppt of TCDD in their blood and they've been followed
20 now for 30 years and other than chloracne, they're
21 still healthy. There is a study by Bacarelli, Andres
22 Bacarelli, who's following these kids. He just
23 published an update last year and if you're -- I know
24 it's kind of details and technical, but he lays out
25 basically his study findings. He's interested in why

1 kids developed chloracne, but he says oh, by the way,
2 we've looked at their health, except for two kids that
3 died; one from trauma and I some other disease that
4 they didn't feel were related, these people are young
5 adults and they're still doing fine.

6 Dr. Bacarelli looked at the sex ratio of some
7 of these parents and what he attributes is that
8 there's more girls than boys. Now, I suspect the data
9 are kind of suspect because it's a small study and it
10 lacks what we call statistical power. You have to
11 take it at face value, could it be real, possibly.
12 What they attribute that to is very high level TCDD
13 exposure in the males. Now, there's a lot of other
14 studies that don't corroborate that. For instance, we
15 just published a three-generation reproductive study
16 in rats, as well as reviewed a number of other rat
17 studies and you don't see sex ratio differences, so
18 why do you have this one spurious finding in Seveso?
19 Well, I'll take it for granted, maybe it's real. So
20 you can read that.

21 Mocarelli has also studied Seveso the entire
22 time. There's a fascinating review article by
23 Mocarelli that updates all the health findings.

24 Now, the cancer findings we're talking about
25 is Bertazzi's study that just came out about a year

1 ago and that was published --

2 AUDIENCE MEMBER: These are actually older
3 studies, and I don't have --

4 BOB BUDINSKY: Bertazzi? No, Bertazzi is
5 most recent. And what -- the problem you have with
6 Seveso is they divided it into zones, Zone A, Zone B,
7 and difficulty is trying to establish, well, okay if a
8 Zone B person -- or Zone B people had higher
9 incidences of breast cancer, maybe a twofold higher
10 excess, is that really related to exposure when Zone A
11 was more highly exposed? So there's some difficulties
12 with interpreting the study results of Bertazzi. Now,
13 those will continue. As this population ages and we
14 get better definition as to what their true mortality
15 is like, hopefully we'll get some really good answers.
16 But up to now, other than chloracne and reversible
17 liver injury in these kids, it was very mild liver
18 injury, typical of what I would incur on a weekend
19 after I drink a lot of Scotch, you know, that's what
20 you're seeing in this population. So you use that out
21 as an unfortunate experiment that happened and you
22 follow it. So there's a great deal of data on there.
23 If you'd like to talk about it more, I'd be more than
24 happy to discuss it with you.

25 AUDIENCE MEMBER: I just have a quick

1 comment, too, about -- I've heard a lot said tonight
2 about risk assessment. There's a growing movement in
3 the industry or, like I guess in the environmental
4 industry that's called a precautionary principle, and
5 it doesn't seem like there's any room for the
6 precautionary principle in what either Dow or the DEQ
7 are talking about doing with potential remediation of
8 the contamination in the river. I mean, at what point
9 --

10 AL TAYLOR: Let him respond.

11 AUDIENCE MEMBER: Well, and then also kind of
12 keylining into that, is the idea that the state says
13 90 parts per trillion is the level that is
14 significant, and you're finding levels in the river
15 that are 84,000 parts per trillion and over 100,000
16 parts per trillion, so at what point does the 90 parts
17 per trillion then get kind of auctioned off to a
18 higher number just to, you know, I guess at the needs
19 of risk assessment and precautionary principles gets
20 tossed out the window?

21 DEB MACKENZIE-TAYLOR: Okay. Well, with
22 regard to the 90 parts per trillion value, it is a
23 value that was developed in 1995. Dow has the option
24 to propose a site-specific criterion, and they are
25 choosing that option. We have to evaluate their

1 | proposal. It's --

2 | AUDIENCE MEMBER: Okay. Where did the site-
3 | specific data come in? Is that in the framework?

4 | DEB MACKENZIE-TAYLOR: No, it's in the
5 | regulation. It's in Part 201, which is the
6 | regulation. They are allowed under the regulation to
7 | propose a site-specific value, and we are required to
8 | --

9 | AUDIENCE MEMBER: And that's where the
10 | Garabrant study comes in to try to --

11 | DEB MACKENZIE-TAYLOR: The Garabrant study --

12 | AUDIENCE MEMBER: Is one of many studies?

13 | DEB MACKENZIE-TAYLOR: -- is one of many
14 | studies we'll be looking at. We'll be looking at any
15 | exposure information we can use from that study, but
16 | it doesn't tell us about the toxicity, and that's what
17 | we will be looking at with the toxicity is all the
18 | data that's available. Maybe not all the data that's
19 | available, because there is, as Tom said, there are
20 | literally thousands of studies of TCDD and other
21 | dioxins, but we will be looking at the information
22 | that's available and evaluating it and we will use
23 | some experts to help us evaluate that data.

24 | AUDIENCE MEMBER: Okay. As far as like
25 | precautionary principles, that --

1 DEB MACKENZIE-TAYLOR: When we do risk
2 assessment, we do conserve -- we are conservative in
3 trying to protect the whole population and look at
4 what we call a reasonable maximum exposure, and we are
5 trying to be protective of the public health. We're
6 not looking at the average person, we're looking at
7 someone who would be more highly exposed --

8 AUDIENCE MEMBER: Like a child.

9 DEB MACKENZIE-TAYLOR: -- and we try to
10 protect for sensitive population, sensitive people in
11 the population. So we're not looking at just, you
12 know, the average person off the street or on the
13 floodplain, we're going to look at an exposure that
14 would be someone who does a lot of activities that
15 could bring them in contact with the contaminant.

16 AL TAYLOR: Okay. It's 9:00 o'clock. I
17 appreciate your attendance and your patience and your
18 excellent interactions tonight.

19 Our next meeting, as it says on the agenda,
20 is on May the 3rd, in this room, 6:30 to 9:00 o'clock.
21 Folks from the DEQ, the EPA, the Department of
22 Community Health and Dow will all stay and talk to you
23 and answer individual questions for the next half
24 hour, so please take advantage of that opportunity.
25 Thank you.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

(Meeting concluded at 9:00 p.m.)

-o0o-

STATE OF MICHIGAN)
) SS
COUNTY OF SAGINAW)

I, Lori L. Brady, CER-6925, and Notary
Public, Saginaw County, acting in Saginaw County, State
of Michigan, hereby certify that the above transcript,
consisting of 115 pages, is a complete, true, and
accurate transcript of the proceedings taken on
Thursday, February 8, 2007.

Date

Lori L. Brady, CER-6925
Certified Electronic Recorder
My Commission Expires: 11-18-12
Bay Area Reporting, Inc.
P.O. Box 6069
Saginaw, Michigan 48608-6069
(989) 791-4441 FAX (989) 393-5999